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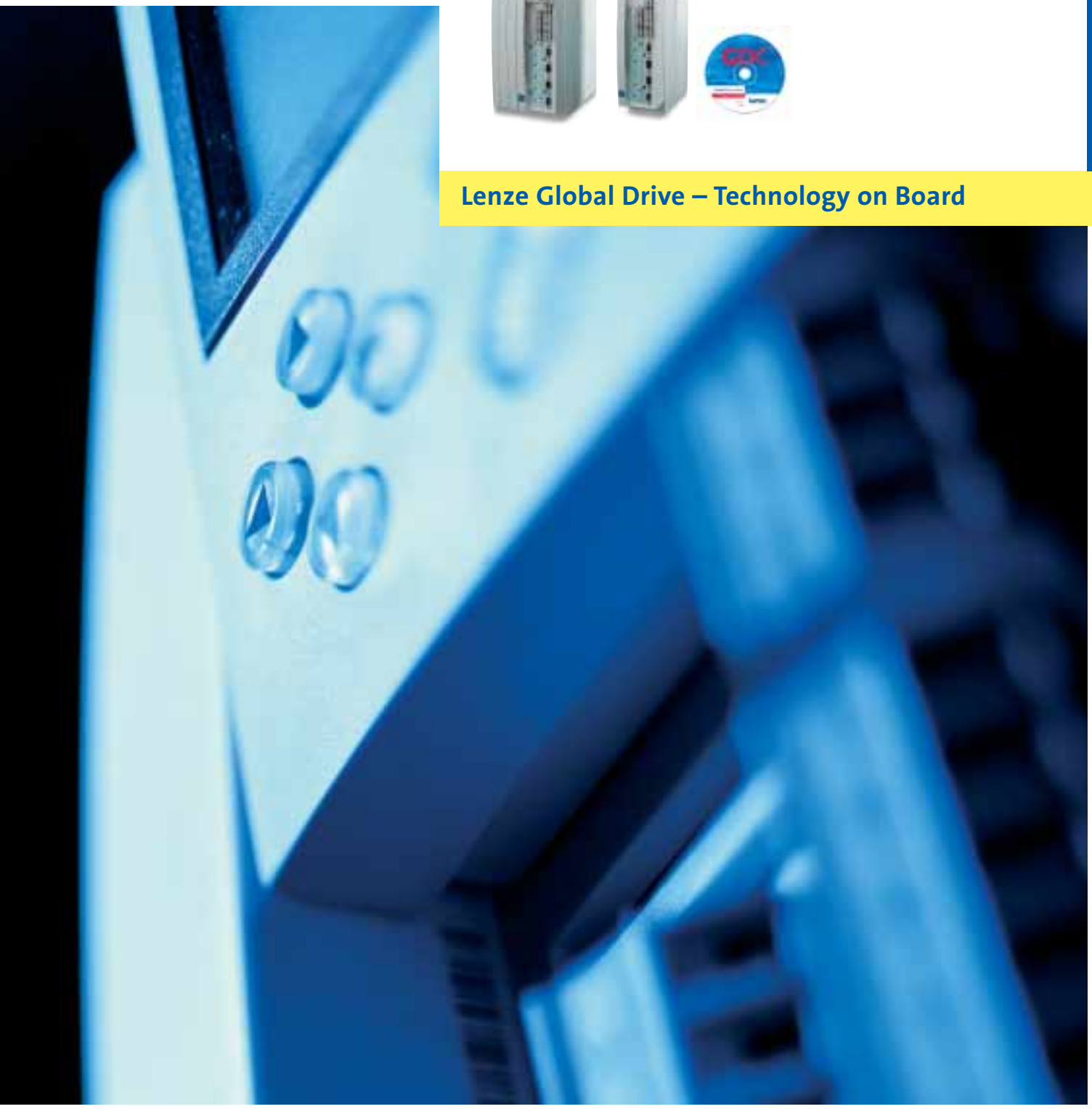
9300 servo inverter

Lenze Global Drive – Technology on Board



Lenze

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No matter which drive solution you imagine, we make your dreams come true.

True to our slogan (one stop shopping) we offer you a complete programme of electronic and mechanical drive systems which is distinguished by reliability and efficiency.

The scope of our programme includes frequency inverters, servo controllers, variable-speed drives, speed reduction gearboxes, motors, brakes, clutches, decentralised I/O and operator and display units.

Many well-known companies use Lenze products in various applications.

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Lenze | An introduction

Lenze is the competent partner for your application. Lenze is not only a supplier for single components but also offers solutions for complete drive systems including planning, execution and commissioning.

Furthermore, a worldwide service and distribution network lets you engage a qualified customer advisory service and an after sales service that is fast and extensive.

Our quality assurance system for design, production, sales and service is certified according to DIN ISO 9001 : 2000. Our environmental management system is also certified to DIN EN ISO 14001.
Our customers set the standards for measuring the quality of our products.
Our task is to meet your requirements, since customer orientation is a Lenze principle demanding the best quality.

See for yourself.

A worldwide service –
Our team of experts provides reliable and professional assistance.

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A true system

Drive and automation technology

Products which are setting the pace in terms of technology and complete drive solutions for machine and system production - just what Lenze is all about. We provide our customers with frequency and servo inverters with powers up to 400 kW. We support both central control cabinet solutions and decentralised drive concepts, e.g. with motor inverters with IP65 type of protection.

Both standard three-phase AC motors and synchronous and asynchronous servo motors are available to complement the various controllers, all of which can be combined with various types of gearboxes. Human Machine Interfaces, decentralised I/O systems and modules for fieldbus interfacing are also available for exchanging information.

Lenze boasts extensive application know-how in all manner of industries. This knowledge has been applied in the design of the controller and PC software, providing an efficient means of implementing numerous standard applications using simple parameter settings.

An all-round service comprising component selection advice, training, commissioning support and even a helpline which can be accessed all over the world and independent system engineering completes the offer.

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9300 servo inverter

ECS servo system for multi-axis application

Communication modules

PC software

9300 vector frequency inverter

8200 vector frequency inverter

8200 motec motor inverter

starttec motor starter

Software packages

Servo motors

Small drives

Brakes and clutches

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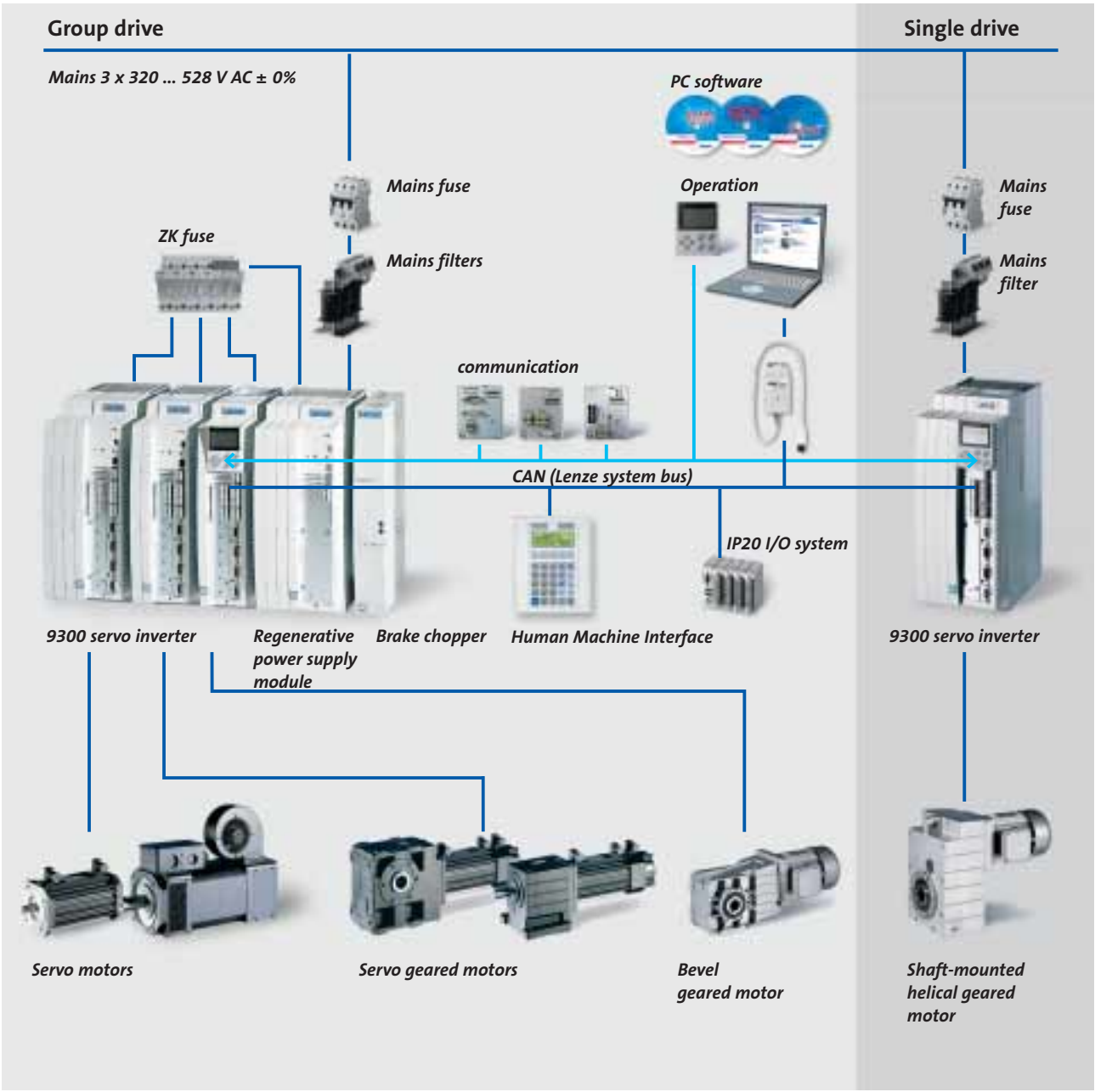
9300 | the family of servo inverters



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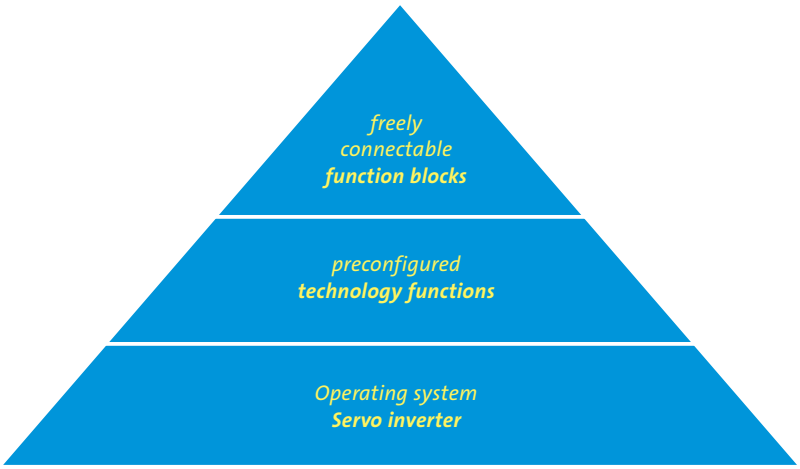
9300 the family of servo inverters

In conjunction with the coordinated range of motors and geared motors, the 9300 family of servo inverters offers a wide range of potential solutions.

The preconfigured technology functions allow different drive tasks to be realised in a particularly easy way. Whether you require a simple speed control or need to operate multiple drives with angular synchronism, a preconfigured solution is available for every type of drive. The same applies to user-friendly positioning control or motion control systems based on can motion for which device variants have been specially created. You are free to choose the internal layout of the function block structure, giving you plenty of options if you need to expand the functionality of the drive. This enables the drive controllers to completely take over the control of subprocesses.



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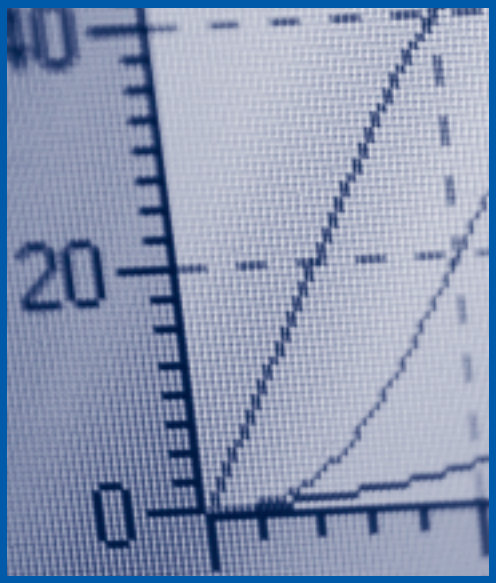

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Description

Servo drive controller with integrated technology functions
The 9300 family of servo inverters deliver a convincing performance with easy handling and a high degree of flexibility which allows them to be adapted to particular operating conditions. On the basis of pre-configured technology functions, the way in which the individual function blocks are connected can be modified to enable the drive to deliver the right performance for the drive application in hand.

Four basic variants are available, enabling Lenze to offer comprehensive support for a wide variety of potential applications:

- 9300 servo inverter
- 9300 servo position controller
- 9300 servo cam
- 9300 servo register controller

All four variants share standardised hardware, so you are free to combine them however you like. Parameterisation and operation also take place via standard device interfaces.

Hardware variants available on request
Types 9321 to 9328 are also available in a version known as "cold plate" for mounting on a separate heatsink. Instead of a built-in heatsink, these devices are supplied with a flat cooling surface on the rear.

Special versions are also available for the integrated "Safe standstill" controller function and for operation on an IT supply system. Combinations of additional functions are also available.

9300 servo inverter
The basic functions which are most commonly required in a servo drive are all implemented in the 9300 servo inverter. The electronic gearbox is a very important technology function in this device. As an alternative to a mechanical line shaft, multiple drives can be run in completely synchronous operation via master frequency coupling. In the process, adjustable gearbox factors can be used to achieve synchronous ratios with a minimum of fuss and a maximum of flexibility. Feedback systems such as resolvers or SinCos encoders are used to ensure utmost precision.

Flat-sheet extrusion system

Palletizer

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9300 servo position controller
Positioning made easy. A complete position control system with sequence control is integrated in the 9300 servo position controller. An easy commissioning process with only a few values to input is a much more modern solution compared to an external positioning control system which uses a more complicated programming language. The signals from limit switches or other drives can also be evaluated at the same time. If the reaching of the target position is subject to tolerances, then the setpoint position can be automatically corrected by evaluation of a target mark.

9300 servo cam
Mechanical cams are often important components of production machinery. Modifying the product or introducing product variants can be a complex process which involves long set-up times. Up to eight different curve profiles can be stored in the 9300 servo cam, allowing the machine to switch between these curves without delays during production. Curve profiles can also be expanded/compressed or phase-shifted in online operation.

Several additional functions have been integrated to allow for the large number of potential applications for the servo cam, including for example electronic camshaft controllers and marker-controlled starting of curves. A function has been integrated especially for the opening and closing of welding bars, which achieves a constant welding period with variable frequencies.

9300 servo register controller
Material lengths are processed in many machines. Overprinting, cuts, perforations, embossing and cemented joints need to be accurately positioned in accordance with the given print image on the material length.

However, due to fluctuations caused by the industrial processes (material properties, production parameters) the position of this print image can drift. In addition to the basic requirement for an "electric shaft", there is also a demand for a higher-level alignment of the rotational movement on the print image with high register accuracy. The register control which is already integrated in the drive controller continuously realigns the angular settings of feeder rollers, printing cylinders, cutting rollers and other processing stations with the print image. As a result, overprints, cuts, perforations, embossing, cemented joints etc. are positioned exactly where they are meant to be.

Filling plant

Printing machine

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Drive features

A true system
- Servo inverters with system-optimised servo motors (asynchronous, synchronous)
- Different device variants for different application areas
- Hardware variants for specific requirements
- Regenerative power supply modules
- Accessories for braking operation

Communication modules
Connections to the most popular types of fieldbus can be made via communication modules which are plugged into the front panel:
- **LECOM-A/B**
  Networking via RS232/485 interface
- **LECOM-LI**
  Networking via optical fibres
- **INTERBUS**
  Connection to the remote bus with DRIVECOM profile 21
- **INTERBUS Loop**
  The bus and power supply are provided on the same cable
- **PROFIBUS-DP**
  Communication via PROFIBUS-DP
- DeviceNet
  Communication between open-loop control systems and simple industrial devices
- CANopen
  Connection to a CANopen master
- **LON**
  Fieldbus connection common in building services systems

Integrated system bus (CAN)
The integrated system bus provides a means of establishing links to other system components (IP20 I/O system, human machine interface) and setting up controller networks. The Lenze system bus uses parts of CANopen.

Integrated mains input
On a single drive, two separate elements are not required.

Regenerative power supply modules
For energy-saving interconnected and multi-axis applications.

Adaptable motors
The modular structure of the motors and the concept-based variants will help you to choose the right solution for any application.
A variety of encoders can be integrated for adaptation to the required accuracy:
- Resolver as the standard solution
- The resolver accuracy can be improved via adjustment
- Incremental encoders or SinCos absolute value encoders can be used for special applications

CE conformity
9300 range servo inverters meet the requirements of the EC Low Voltage Directive.

UL approval
UL approval to UL508C indicates that these controllers are suitable for use anywhere in the world.

Mounting
The servo inverters are particularly compact as they can be mounted directly side by side, without the need for any clearance in between. Thanks to an extensive range of fixing accessories, they can be used in a variety of mounting positions. Thermal separation is also possible.

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Type	9300 servo inverter	9300 servo position controller	9300 servo cam	9300 servo register controller
Integrated mains input	●	●	●	●
DC terminals for DC-bus connection	●	●	●	●
Communication interface	Integrated system bus (CAN) Clip-on keypad RS232/485 [1] or PROFIBUS-DP [1] or INTERBUS [1] or INTERBUS-Loop [1] or DeviceNet [1]/ CANopen [1] or LON [1]			
Digital inputs	6 = 1 controller release + 5 freely assignable inputs (2 inputs with touch probe function) can be expanded by adding IP20 I/O system or terminal extension			
Digital outputs	4 (50 mA each), can be expanded by adding IP20 I/O system or terminal extension			
Analog inputs	1 (11 bits + sign) -10 ... +10 V or -20 ... +20 mA 1 (11 bits + sign) -10 ... +10, can be expanded by adding IP20 I/O system			
Analog outputs	2 (9 bits + sign) -10 ... +10 V max. 20 mA, can be expanded by adding IP20 I/O system			
Master frequency input	0 ... 500 kHz			
Master frequency output	0 ... 500 kHz			
Feedback inputs	1. Resolver, 2. Incremental or SinCos absolute value encoder			
Freely connectable function blocks	●	●	●	●
Preconfigured technology functions	●	●	●	●
Manual control	●	●	●	●
Homing, reference point setting	●	●	●	●
Synchronous operation via master frequency	●	●	●	●
Standby operation	–	●	●	–
Point-to-point positioning (absolute/ relative - with/without velocity changeover)	–	●	–	–
Speed and acceleration-override	–	●	–	–
Touch probe positioning	–	●	–	–
Sequence control via 32 program blocks	–	●	–	–
Position teach-in function	–	●	–	–
8 curve profiles can be saved	–	–	●	–
Expansion/compression of the curve profiles	–	–	●	–
Offset in x and y-direction	–	–	●	–
Virtual master	–	–	●	–
Integrated position switch points	–	●	●	–
Follow-up controller for gearbox factor follow-up control	–	–	–	●
Teach-in function for significant path marker	–	–	–	●
Path marker window	–	–	–	●
Error compensation for path marker	–	–	–	●

[1] Pluggable communication modules

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Standards and operating conditions

Area	Values
Vibration resistance	Germanischer Lloyd, general conditions
Permissible humidity	Humidity class F without moisture condensation (average relative humidity 85%)
Permissible temperature ranges	Transport: -25 ... +70 °C Storage: -25 ... +55 °C Operation: 0 ... +50 °C/+55 °C +40 ... +55 °C with power reduction (2%/K) (devices 9321-9326) +40 ... +50 °C with power reduction (2%/K) (devices 9327-9332)
Permissible installation height	Up to 4000 m amsl 1000 ... 4000 m amsl with power reduction (5%/1000 m)
Pollution degree	VDE 0110 Part 2, pollution degree 2
Interference emission	Requirements to EN 50081-1, EN 50081-2, EN 61800-3 Limit class A to EN 55011 (industrial premises) with mains filter A Limit class B to EN 55022 (residential area) with mains filter B and control cabinet installation
Noise immunity	Limit values satisfied with mains filter. Requirements to EN 50082-2, EN 61800-3 **Requirements** / **Standard** / **Severity** ESD / EN61000-4-2 / 3, i.e. 8 kV with air discharge and 6 kV with contact discharge RF interference (housing) / EN61000-4-3 / 3, i.e. 10 V/m; 27 ... 1000 MHz Burst / EN61000-4-4 / 3/4, i.e. 2 kV/5 kHz Surge (surge voltage on mains cable) / IEC 1000-4-5 / 3, i.e. 1.2/50 µs 1 kV phase-phase, 2 kV phase-PE
Insulation resistance	Overvoltage category III to VDE 0110
Packaging	to DIN 4180 ▶ 9321 to 9326: Dust protection packaging ▶ 9327 to 9332: Shipping container
Enclosure	IP20 IP41 on heatsink side with push-through technique thermal separation NEMA 1: Shock protection
Labelling	CE: Meets the requirements of the EC's Low Voltage Directive
Approvals	UL: Approval to UL 508C: Power Conversion Equipment, file no. E132659

General notes

- ▶ Only use the devices as built-in units:
  Use either the fixing rails supplied (see page 1-10) or thermal separation (see page 1-11) for mounting.
- ▶ If the cooling air contains pollutants (dust, fluff, grease, aggressive gases) then appropriate countermeasures must be in place (e.g. installation of filters, regular cleaning, etc.)
- ▶ Ensure there is enough free space:
  – several units can be mounted directly adjacent to one another
  – Ensure that there is free access for cooling air to be taken in and exhaust air to escape
  – Ensure free space of 100 mm above and below
- ▶ In the event of continuous vibrations or oscillations, consider the use of vibration dampers

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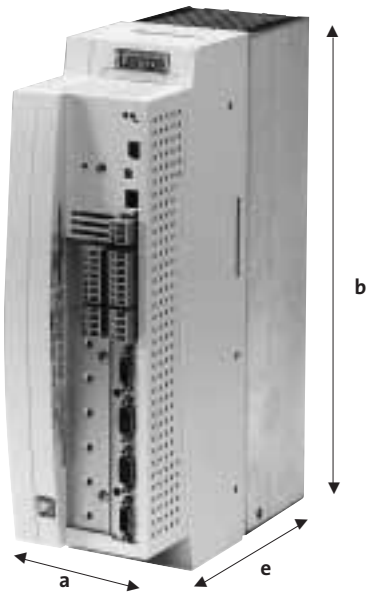
Rated data

Type		9321	9322	9323	9324	9325
9300 servo inverter order no.		**EVS9321-ES**	**EVS9322-ES**	**EVS9323-ES**	**EVS9324-ES**	**EVS9325-ES**
9300 servo position controller order no.		**EVS9321-EP**	**EVS9322-EP**	**EVS9323-EP**	**EVS9324-EP**	**EVS9325-EP**
9300 servo cam order no.		**EVS9321-EK**	**EVS9322-EK**	**EVS9323-EK**	**EVS9324-EK**	**EVS9325-EK**
9300 servo register controller order no.		**EVS9321-ER**	**EVS9322-ER**	**EVS9323-ER**	**EVS9324-ER**	**EVS9325-ER**
Mains voltage	U_r [V]	3 AC 320 ... 528 V ± 0% ; 45 ... 65 Hz ± 0%				
Alternative DC supply	U_{DC} [V]	DC 460 ... 740 V ± 0%				
Data for mains operation: 3 AC 400 V, 50 Hz/ 60 Hz						
Motor power (4-pole ASM)	P_r [kW]	0.37	0.75	1.5	3.0	5.5
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	1.5 / 1.05 [3]	2.5 / 1.7 [3]	3.9 / 2.6 [3]	7.0 / 4.7 [3]	13.0
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	1.1 / 0.77 [3]	1.8 / 1.26 [3]	2.9 / 2.03 [2]	5.2 / 3.64 [3]	9.7
Output power	S_{r8} [kVA]	1.0	1.7	2.7	4.8	9.0
Data for mains operation: 3 AC 480 V, 50 Hz/ 60 Hz						
Motor power (4-pole ASM)	P_r [kW]	0.37	0.75	1.5	3.0	5.5
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	**1.5 / 1.05** [3]	**2.5 / 1.7** [3]	**3.9 / 2.6** [3]	**7.0 / 4.7** [3]	**13.0**
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	1.1 / 0.77 [3]	1.8 / 1.26 [3]	2.9 / 2.03 [3]	5.2 / 3.64 [3]	9.7
Output power	S_{r8} [kVA]	1.2	2.1	3.2	5.8	10.8
Max. output current (8 kHz) [1] [2]	I_{max}	**2.3 / 3.0** [3]	**3.8 / 5.0** [3]	**5.9 / 7.8** [3]	**10.5 / 14** [3]	**19.5**
Max. output current (16 kHz) [1] [2]	I_{max}	1.65 / 2.2 [3]	2.7 / 3.6 [3]	4.4 / 5.8 [3]	7.8 / 10.4 [3]	14.6
Mains current at U_{mains} = 400 V	I_r [A]	1.5	2.5	3.9	7.0	12.0
Motor voltage	U_M [V]	3 ~ 0 ... U_{mains}				
Power loss at U_{mains} = 400 V	P_v [W]	100	110	140	200	260
Power reduction	[%/K] [%/m]	40 ... 55°C: 2%/K (not UL-approved) 1000 ... 4000 m amsl: 5%/1000 m				
Dimensions a b e	[mm]	78 x 350 x 250	78 x 350 x 250	97 x 350 x 250	97 x 350 x 250	135 x 350 x 250
Weight	m [kg]	3.5	3.5	5.0	5.0	7.5

[1] Inverter switching frequency
[2] Currents valid for periodic load change cycle with max. 1 minute overcurrent duration and 2 minutes base load duration at max. 75% I_{rx}
[3] Operating mode acceleration drive: The maximum overcurrent duration is 10 s at 50 s base load duration at max 44% I_{rx}



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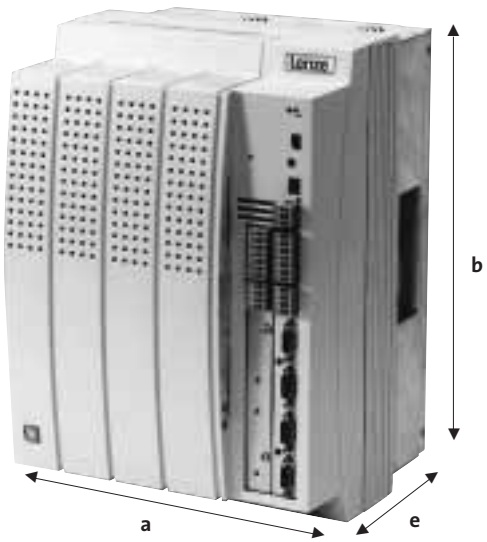
Rated data

Type		9326	9327	9328	9329
9300 servo inverter order no.		**EVS9326-ES**	**EVS9327-ES**	**EVS9328-ES**	**EVS9329-ES**
9300 servo position controller order no.		**EVS9326-EP**	**EVS9327-EP**	**EVS9328-EP**	**EVS9329-EP**
9300 servo cam order no.		**EVS9326-EK**	**EVS9327-EK**	**EVS9328-EK**	**EVS9329-EK**
9300 servo register controller order no.		**EVS9326-ER**	**EVS9327-ER**	**EVS9328-ER**	**EVS9329-ER**
Mains voltage	U_r [V]	3 AC 320 ... 528 V ± 0% ; 45 ... 65 Hz ± 0%			
Alternative DC supply	U_{DC} [V]	DC 460 ... 740 V ± 0%			
Data for mains operation: 3 AC 400 V, 50 Hz/ 60 Hz					
Motor power (4-pole ASM)	P_r [kW]	11.0	15.0	22.0	30.0
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	23.5	32.0	47.0	59.0
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	15.3	20.8	30.6	38.0
Output power	S_r [kVA]	16.3	22.2	32.6	40.9
Data for mains operation: 3 AC 480 V, 50 Hz/ 60 Hz					
Motor power (4-pole ASM)	P_r [kW]	11.0	18.5	30.0	37.0
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	**22.3**	**30.4**	**44.7**	**56.0**
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	14.5	19.2	28.2	35.0
Output power	S_r [kVA]	18.5	25.0	37.0	46.6
Max. output current (8 kHz) [1] [2]	I_{max}	**35.3**	**48.0**	**70.5**	**88.5**
Max. output current (16 kHz) [1] [2]	I_{max}	22.9	31.2	45.9	57
Mains current at U_{mains} = 400 V	I_r [A]	20.5	27.0	44.0	53.0
Motor voltage	U_M [V]	3 ~ 0 ... U_{mains}			
Power loss at U_{mains} = 400 V	P_v [W]	360	430	640	810
Power reduction	[%/K] [%/m]	40 ... 55°C: 2%/K (not UL-approved) 1000 ... 4000 m amsl: 5%/1000 m			
Dimensions a b e	[mm]	 135 x 350 x 250	 250 x 350 x 250	 250 x 350 x 250	 250 x 350 x 250
Weight	m [kg]	7.5	12.5	12.5	12.5

[1] Inverter switching frequency
[2] Currents valid for periodic load change cycle with max. 1 minute overcurrent duration and 2 minutes base load duration at max. 75% I_{rx}



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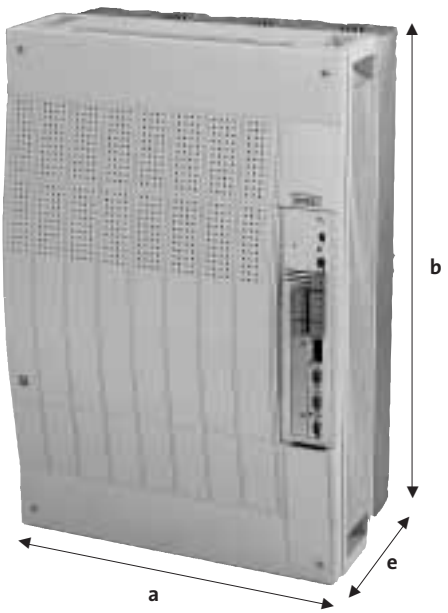
Rated data

Type		9330	9331	9332
9300 servo inverter order no.		**EVS9330-ES**	**EVS9331-ES**	**EVS9332-ES**
9300 servo position controller order no.		**EVS9330-EP**	**EVS9331-EP**	**EVS9332-EP**
9300 servo cam order no.		**EVS9330-EK**	**EVS9331-EK**	**EVS9332-EK**
9300 servo register controller order no.		**EVS9330-ER**	**EVS9331-ER**	**EVS9332-ER**
Mains voltage	U_r [V]	3 AC 320 ... 528 V ± 0% ; 45 ... 65 Hz ± 0%		
Alternative DC supply	U_{DC} [V]	DC 460 ... 740 V +/-0%		
Data for mains operation: 3 AC 400 V, 50 Hz/60 Hz				
Motor power (4-pole ASM)	P_r [kW]	45.0	55.0	75.0
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	89.0	110.0	145.0
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	58.0	70.0	90.0
Output power	S_r [kVA]	51.5	76.2	100.9
Data for mains operation: 3 AC 480 V, 50 Hz/60 Hz				
Motor power (4-pole ASM)	P_r [kW]	45.0	55.0	90.0
Output current I_{r8} (8 kHz) [1]	I_{r8} [A]	**84.0**	**105.0**	**125.0**
Output current I_{r16} (16 kHz) [1]	I_{r16} [A]	55.0	65.0	80.0
Output power	S_r [kVA]	69.8	87.8	104.0
Max. output current (8 kHz) [1] [2]	I_{max}	**133.5**	**165.0**	**225.0**
Max. output current (16 kHz) [1] [2]	I_{max}	87	105	135
Mains current at U_{mains} = 400 V	I_r [A]	78.0	96.4	129.1
Motor voltage	U_M [V]	3 ~ 0 ... U_{mains}		
Power loss at U_{mains} = 400 V	P_v [W]	1100	1470	1960
Power reduction	[%/K] [%/m]	40 ... 50°C: 2%/K (not UL-approved) 1000 ... 4000 m amsl: 5%/1000 m		
Dimensions a b e	[mm]	 340 x 591 x 285	 440 x 680 x 285	 440 x 680 x 285
Weight	m [kg]	36.5	59.0	59.0

[1] Inverter switching frequency
[2] Currents valid for periodic load change cycle with max. 1 minute overcurrent duration and 2 minutes base load duration at max. 75% I_{rx}



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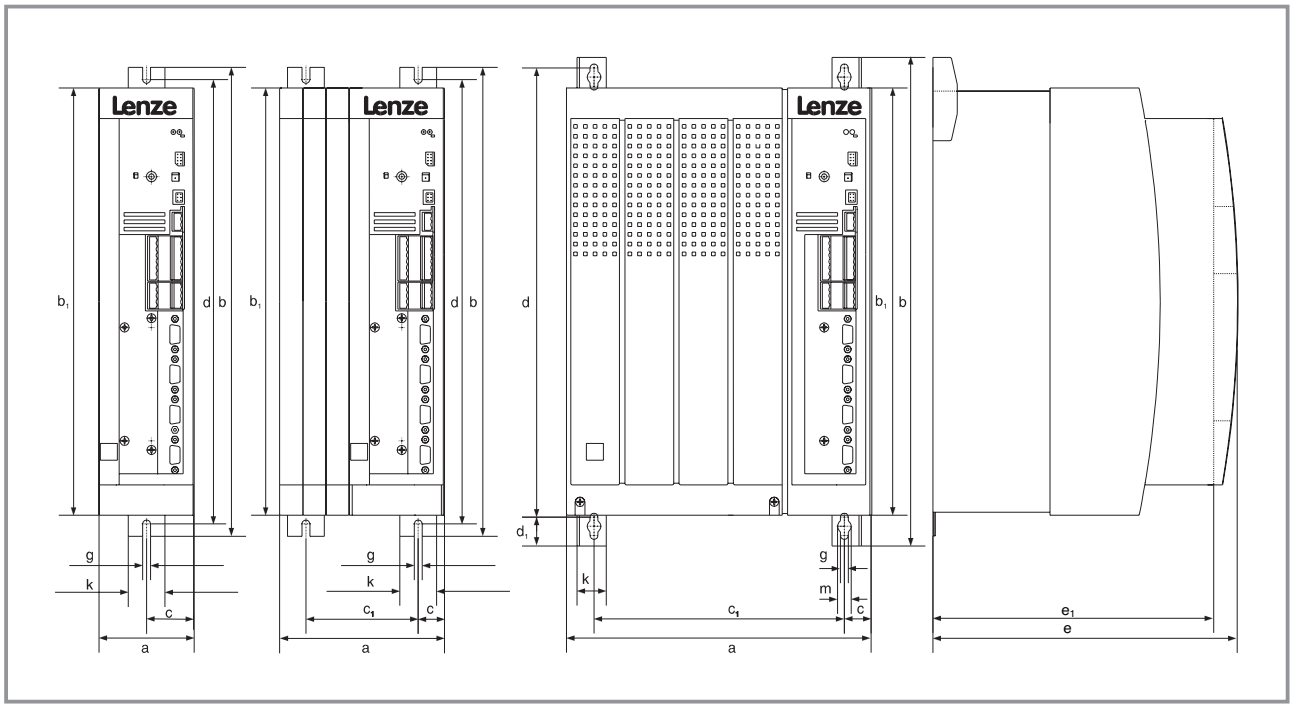
Installation with fixing rail

The 9300 Servo PLC is supplied with a mounting rail. The mounting rail is fixed to the device in a guideway, providing access to fixing clamps from above and below. It can be used to fix the 9300 Servo PLC to the rear of the control cabinet or to the mounting plate.



Device	Dimensions [mm]											
	a	b	b_1	c	c_1	d	d_1	e	e_1	g	k	m
9321	78	384	350	39	–	365	–	250	230	6.5	30	–
9322	78	384	350	39	–	365	–	250	230	6.5	30	–
9323	97	384	350	48.5	–	365	–	250	230	6.5	30	–
9324	97	384	350	48.5	–	365	–	250	230	6.5	30	–
9325	135	384	350	21.5	92	365	–	250	230	6.5	30	–
9326	135	384	350	21.5	92	365	–	250	230	6.5	30	–
9327	250	402	350	22	206	370	23.5	250	230	6.5	24	11.0
9328	250	402	350	22	206	370	23.5	250	230	6.5	24	11.0
9329	250	402	350	22	206	370	23.5	250	230	6.5	24	11.0
9330	340	672	591	28.5	283	624	38	285	265	11.0	28	18.0
9331	450	748.5	680	30.5	389	702	38	285	265	11.0	28	18.0
9332	450	748.5	680	30.5	389	702	38	285	265	11.0	28	18.0

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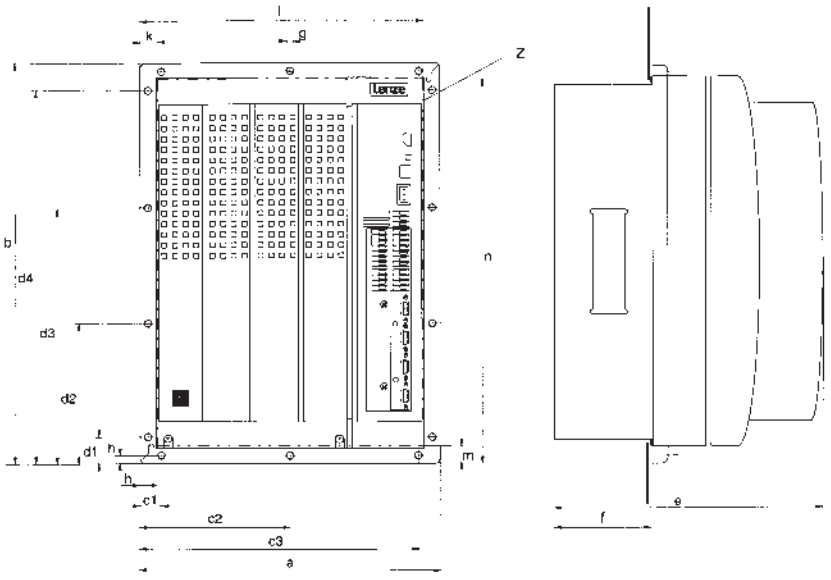
Installation with thermal separation (push-through technique)

Thermal separation is recommended for some applications. It significantly reduces heat generation inside the control cabinet.

Devices with the heatsink outside the control cabinet can be supplied for such applications. They require an assembly frame and a seal.

- The power loss is distributed as follows:
  - Approx. 65% via separate cooler (heatsink and fan)
  - Approx. 35% internally in the device
- The protection class of the separate cooler is IP41
- The rated data for the drive are still valid.

Device	Mounting set for thermal separation Order no.	Mounting cutout		Dimensions [mm]			
		Height	Width	a	b	e	f
9321, 9322	EJ0036	350 ± 3	82 ± 3	112.5	385.5	250	92
9323, 9324	EJ0037	350 ± 3	101 ± 3	131.5	385.5	250	92
9325, 9326	EJ0038	350 ± 3	139 ± 3	169.5	385.5	250	92
9327-9329	EJ0011	336 + 1	236 + 1	279.5	379.5	250	90.5
9330	EJ0010	492 ± 1	320 ± 1	373	543	285	121.5
9331, 9332	EJ0009	698 + 1	428.5 + 1	488	718	285	121.5



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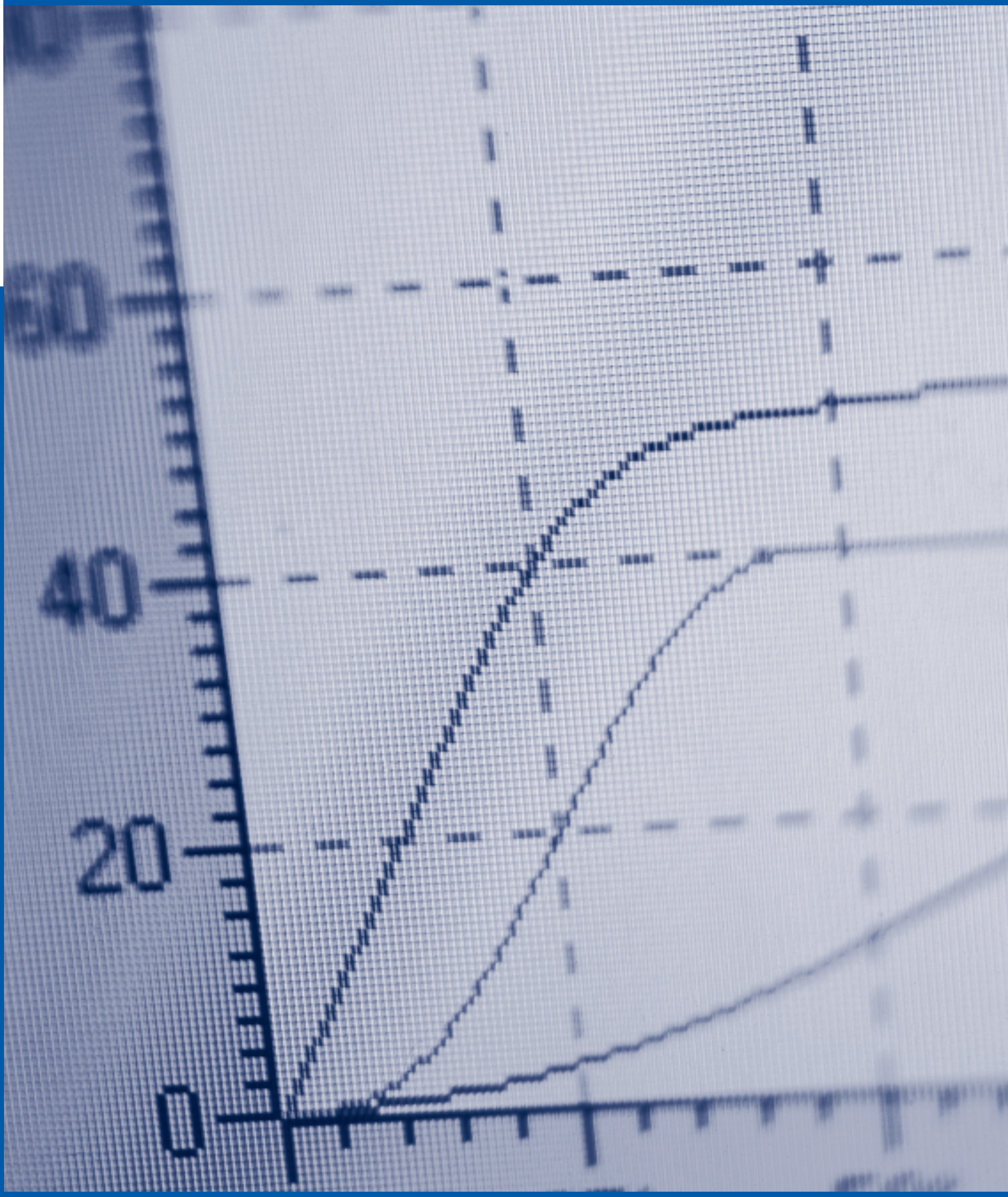
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Software | 9300 servo inverter

General

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Licences 2-3
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PC software

OPC DriveServer 2-8
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HMI Designer 2-20
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Description

Lenze can offer you a range of PC software designed to meet the requirements of various tasks. Whether you are configuring, commissioning or diagnosing Lenze devices, you are bound to find the right software product for any task.

OPC DriveServer communication software, page 2-8
The OPC-compliant DriveServer is a high-performance communication software program. Using any OPC-compatible visualisation software, you can access all Lenze device parameters. You can also use the OPC DriveServer for remote maintenance via LAN networks with a Windows PC or for remote maintenance of an existing system with Simatic S7/teleservice and lower-level Lenze devices.

Global Drive Control operating software, page 2-13
Global Drive Control features easy-to-understand and transparent interfaces for operation, parameter setting, commissioning and diagnostics on Lenze devices, providing the user with full access to all parameters for configuring and diagnosing Lenze drives. The oscilloscope function also provides a high-performance function for diagnosing the 9300 servo controller. Simple programming is even possible with the Function Block Editor.

Global Drive Loader standard system setup program, page 2-21
The Global Drive Loader was developed specifically for standard system setup. As it has no complex programming or parameter setting interfaces, it is extremely easy to use. Once parameter sets and programs have been created, they can be downloaded to Lenze controllers – preventing unauthorised changes and associated errors.

CamDesigner cam editor, page 2-18
CamDesigner provides a quick means of creating and optimising motion provides and cam groups for electronic cams. Even complex motion profiles can be created very easily by combining axes.

HMI Designer, page 2-20
HMI Designer makes programming operator/display terminals easy. It is as easy to optimise the operator/display terminals for the Lenze controllers as it is to operate them subsequently.

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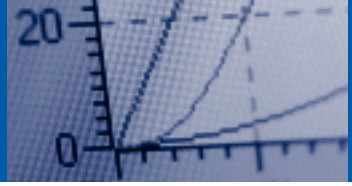

New versions

New versions of PC software can be obtained in a variety of formats as soon as they become available. A distinction is drawn between updates and upgrades. Only software for which a valid licence is held can be updated or upgraded. Purchasing an update or upgrade does not equate to purchasing a new licence.

Updates
Main version software releases for troubleshooting with some simple function extensions. The digit after the decimal point (version sub-revision number) changes for an update (e.g. Version 1.0 to Version 1.1). Updates can be downloaded free of charge from the Downloads area at www.lenze.de. Updates can also be provided on CD for a small fee.

Upgrades
Software with essential function extensions for upgrading to a new version. The digit before the decimal point (main version number) changes for an upgrade (e.g. Version 1.0 to 2.0). Upgrades are subject to payment and are supplied on CD.

Licences

Lenze offers various types of licence for software. Each software product includes a description of the type of licence with which it is supplied.

Single user licence
Single user licences are always supplied with a software product on CD. The purchaser is entitled to install the software product on his/her PC. Multiple installations on various PCs are not permitted.

Multiple user licence
Some software products can be supplied with multiple user licences. When you purchase a multiple user licence, you acquire the right to install a specific software product (CD with single user licence) on the number of machines for which licences have been purchased.

A legally valid single user licence must be held before multiple user licences can be purchased.

Corporate licence
Software products with corporate licences need only be purchased once. These products may be installed on multiple machines within one company. In such cases, additional multiple user licences are not required.

Licensing and contractual conditions
It is forbidden to make unauthorised copies of software – a sufficient number of licences must always be purchased. Should you discover that you do not possess a sufficient number of licences, please contact your sales representative.

The information above has been provided to help you to improve your understanding of our licensing conditions. We should like to point out that the information provided is not legally binding and has simply been provided by way of explanation. Legally binding licensing information can be found in the current licensing and contractual conditions supplied with every software product.

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Communication paths

Lenze devices can communicate with one another in a wide variety of ways – this is also true of course of communication between a PC on which appropriate PC software has been installed and one or more Lenze devices.

The possible communication paths between PC software and Lenze devices are outlined below, along with information about the adapters and connecting cables required.

Example for reading the tables

You have, for example, one 9300 servo inverter and one 8200 vector. You want to use GD Loader to transfer parameter sets to both drives via the system bus. Your PC does not have any parallel interfaces free – one USB interface is available.

Move from left to right across the table, as shown in the example below:

Result:
You can use the integrated system bus on the 9300 servo inverter. You need the E82ZAFCC□□□ system bus function module for the 8200 vector. The connection for both drives is made via the system bus cable.

You can use GD Loader to communicate via the USB interface if you use the EMF2177IB system bus adapter.

Example

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 vector 9300 servo contr. 9300 Servo PLC Drive PLC ECS	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the system bus adapters)	System bus adapter EMF2173IB (incl. variants)	Parallel (printer interface)	GDC [1] GD Loader DriveServer (system bus bus server)
	CANopen communication module EMF2175IB				
8200 vector 8200 motec starttec Drive PLC	System bus function module E82ZAFCC□□□		System bus adapter EMF2177IB	USB	
Decentral. I/O system	Integrated system bus				

Parameter set transfer on system bus (CAN)

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 vector 9300 servo controller 9300 Servo PLC Drive PLC ECS	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the system bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	GDC [1] GD Loader DriveServer (system bus bus server)
	CANopen Communication module **EMF2175IB**				
8200 vector 8200 motec starttec Drive PLC	System bus function module **E82ZAFCC□□□**		System bus adapter **EMF2177IB**	USB	
Decentral. I/O system	Integrated system bus				

[1] Communication possible via the DriveServer product (with appropriate bus server)

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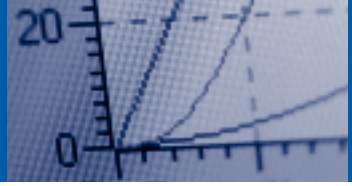

Parameter set transfer on LECOM-A/B/LI

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
8200 vector 9300 vector 9300 servo controller 9300 Servo PLC Drive PLC ECS	Communication module LECOM-A/B **EMF2102IBCV001**	Serial cable to one target system **EWL0020** **EWL0021**	No PC adapter [4]	Serial (RS232)	GDC [6] DriveServer (LECOM bus server)
	Communication module LECOM-LI **EMF2102IBCV003**	Optical fibre to one target system **EWZ0006** **EWZ0007**	Optical fibre adapter **EMF2125IB** **EMF2126IB**		
8200 motec [2] starttec [2]	Diagnosis terminal with PC interface LECOM-A **E82ZBL-C**	Serial cable to one target system [2] **EWL0020** **EWL0021**	No PC adapter [4]		

Parameter set transfer via Simatic S7 on PROFIBUS

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
8200 vector 9300 vector 9300 servo controller 9300 Servo PLC Drive PLC ECS	Communication module **EMF2133IB**	PROFIBUS via S7	S7 PC adapter [5]	Serial (RS232)	GDC (only via S7 bus server) S7 DriveServer (S7 bus server)
			S7 PC adapter USB [5]	USB	
	Fieldbus function module **E822AFPC□□□** [3]		MPI/PROFIBUS-card	PCI/PCMCIA	
			Network card [5]	Ethernet	

Program data transfer on system bus (CAN)

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 Servo PLC Drive PLC ECS	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the system bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	DDS [1] GD Loader DriveServer (system bus bus server)
			System bus adapter **EMF2177IB**	USB	

Project data transfer for HMIs

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
HMI	Internal interface ASP8	Spec. download cable, serial **EPZ-H110** **EPZ-H111**	No adapter	Serial (RS232)	HMI Designer

[1] Cannot be used for ECS
[2] An E82ZBL-C diagnosis terminal and E82ZWL025 connecting cable are also required for the 8200 motec and starttec
[3] For 8200 vector only
[4] A standard RS232/RS485 converter and an RS485 connecting cable are required for LECOM-B
[5] Standard cards and adapter compatible with Simatic S7 required
[6] Communication possible via the DriveServer product (with appropriate bus server)

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Communication paths

Oscilloscope data transfer on system bus (CAN)

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 Servo PLC Drive PLC ECS axis module	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the system bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	GD Oscilloscope [2]
			System bus adapter **EMF2177IB**	USB	

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 servo controller	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the system bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	GDC
			System bus adapter **EMF2177IB**	USB	

Oscilloscope data transfer on LECOM-A/B/LI

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 servo controller	Communication module LECOM-A/B **EMF2102IBCV001**	Serial cable to one target system **EWL0020** **EWL0021**	No PC adapter [1]	Serial (RS232)	GDC
	Communication module LECOM-LI **EMF2102IBCV003**	Optical fibre to one target system **EWZ0006** **EWZ0007**	Optical fibre adapter **EMF2125IB** **EMF2126IB**		

Cam data transfer on system bus (CAN)

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 servo cam	Integrated system bus CAN	System bus cable, bus connection to several target systems (supplied with the sytem bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	GDC [2] (poss. with CamDesigner as cam editor) DriveServer (system bus bus server)
	Communication modules **EMF2175IB**		System bus adapter **EMF2177IB**	USB	

[1] A standard RS232/RS485 converter and an RS485 connecting cable are required for LECOM-B
[2] Communication possible via the DriveServer product (with appropriate bus server)

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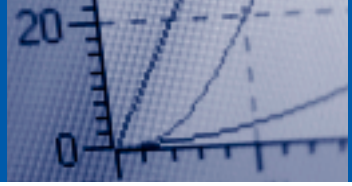

Cam data transfer on system bus (CAN)

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 Servo PLC [2] ECS axis module [3]	Integrated system bus	System bus cable, bus connection to several target systems (supplied with the bus adapters)	System bus adapter **EMF2173IB** (incl. variants)	Parallel (printer interface)	DDS [1] GD Loader CamDesigner DriveServer (system bus bus server)
			System bus adapter **EMF2177IB**	USB	

Cam data transfer on LECOM-A/B/LI

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 servo cam	Communication module LECOM-A / B EMF2102IBC	Serial cable to one target system **EWL0020** **EWL0021**	No PC adapter [4]	Serial (RS232)	GDC [6] (poss. with CamDesigner as cam editor) DriveServer (LECOM bus server)
	Communication module LECOM-LI EMF2102IBC	Optical fibre to one target system **EWZ0006** **EWZ0007**	Optical fibre adapter **EMF2125IB** **EMF2126IB**		

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 Servo PLC [2] ECS axis module [3]	Communication module LECOM-A / B **EMF2102IBCV001**	Serial cable to one target system **EWL0020** **EWL0021**	No PC adapter [4]	Serial (RS232)	CamDesigner [6] DriveServer (LECOM bus server)
	Communication module LECOM-LI **EMF2102IBCV003**	Optical fibre to one target system **EWZ0006** **EWZ0007**	Optical fibre adapter **EMF2125IB** **EMF2126IB**		

Cam data transfer via Simatic S7 on PROFIBUS

Target system			PC		
Device	**Interface**	**Connection**	**PC adapter**	**Interface**	**Program**
9300 servo cam	Communication module **EMF2133IB**	PROFIBUS via S7	S7 PC adapter [5]	Serial	GDC (only via S7 bus server) DriveServer S7 (S7 bus server)
			S7 PC adapter USB [5]	USB	
			MPI/PROFIBUS-card	PCI/PCMCIA	
			Network card [5]	Ethernet	

[1] Cannot be used for ECS
[2] Operating system V6.0 and higher
[3] Operating system V3.0 and higher
[4] A standard RS232/RS485 converter and an RS485 connecting cable are required for LECOM-B
[5] Standard cards and adapter compatible with Simatic S7 required
[6] Communication possible via the DriveServer product (with appropriate bus server)

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OPC DriveServer

Version 1.1

New version

"Software bus" communication interface

The OPC DriveServer provides the connection to your application software. It is the basis for communication between the individual tools. Every application which supports the OPC interface can therefore access the complete functionality of the drives. The OPC DriveServer acts as a layer between the application program and communication channel. The bus servers house the fieldbus specifications and the OPC DriveServer possesses the required device knowledge. This makes the OPC DriveServer both an OPC server and an OPC client.

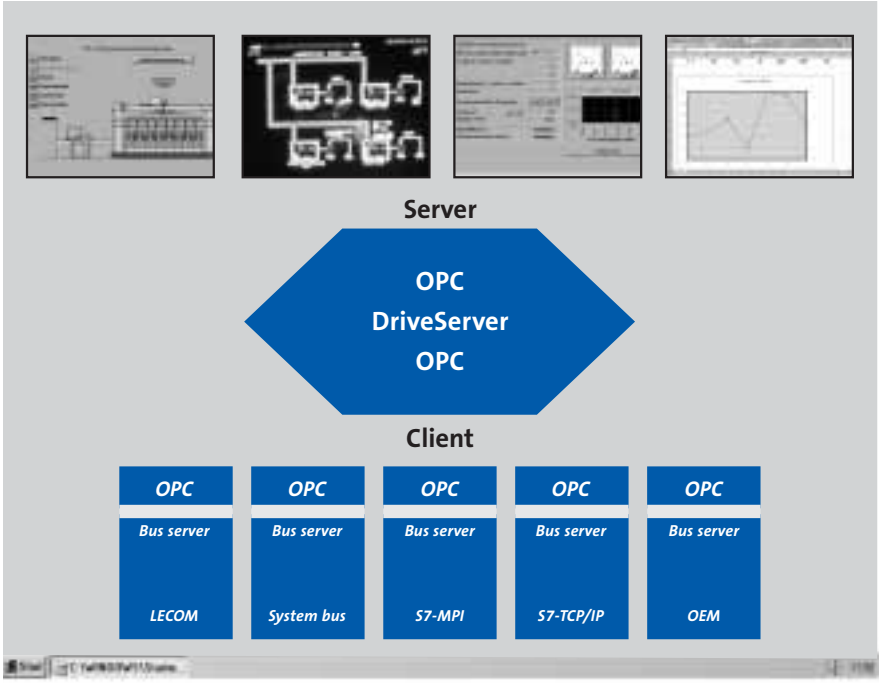
Advantages

- Access to all parameters with any OPC-compatible visualisation software, even in plain text
- Remote maintenance via LANs (switched connections are even possible with a local Windows PC)
- Remote maintenance via an existing system with Simatic S7 and teleservice

The open architecture means that bus servers supplied by OEMs can also be used.

Bus servers currently available from Lenze

- Lenze LECOM-A/B/LI
- Lenze system bus
- Lenze S7 MPI/S7 Ethernet/S7 PROFIBUS-DP



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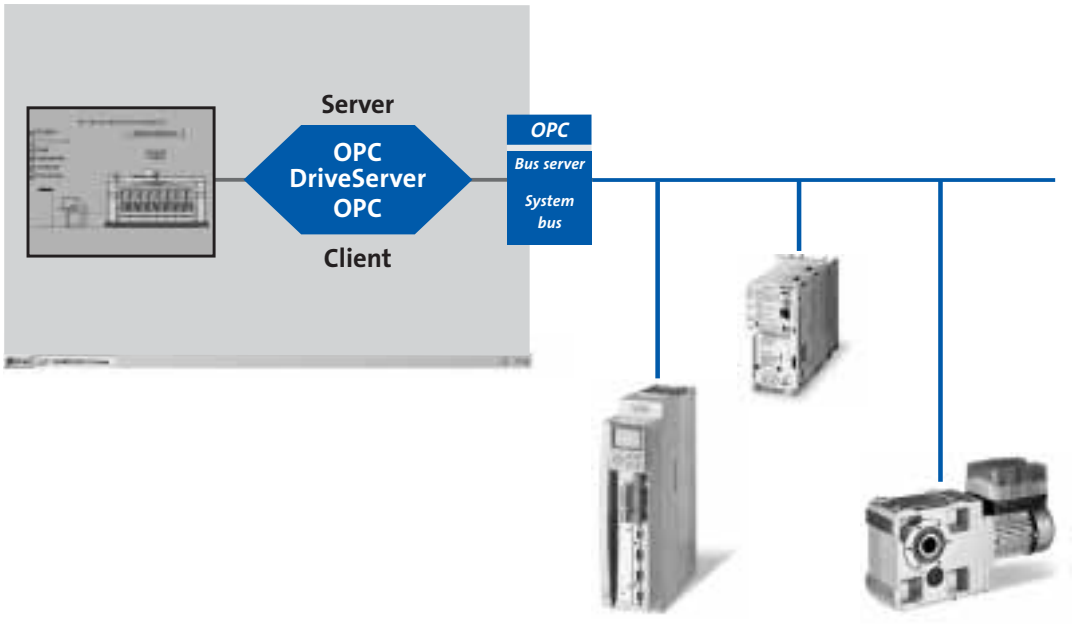
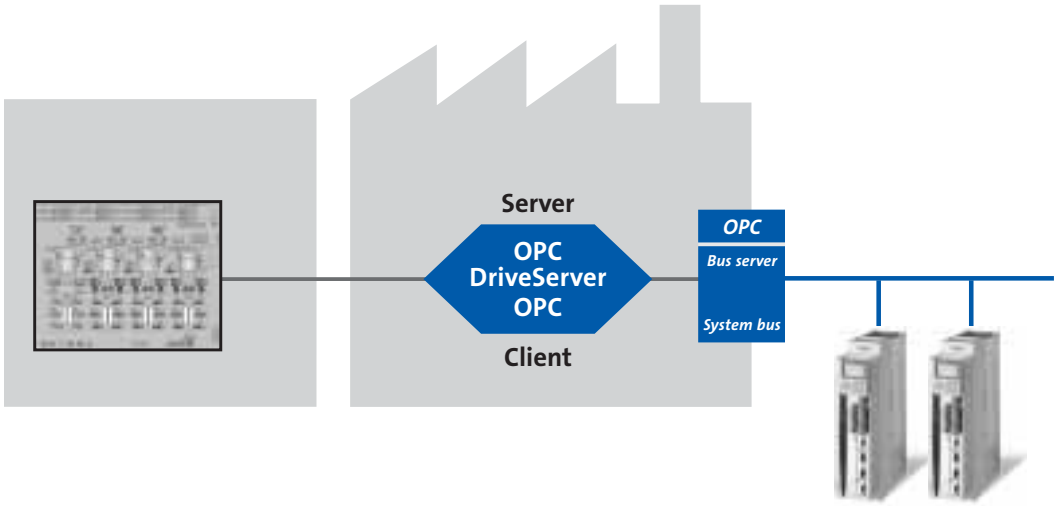
Network solutions and remote maintenance
The OPC DriveServer supports a range of different network topologies. Some typical topologies are described briefly below.

▶ **Topology 1: Single worknode**
In the simplest case, the fieldbus interface and operating programs are located on the same PC, thereby enabling access to Lenze 8200 vector, 9300 Servo and 8200 motec controllers alike.



▶ **Topology 2: Local network**
On a local network, access to the OPC DriveServer and therefore to the drives connected to it can be made from any PC.



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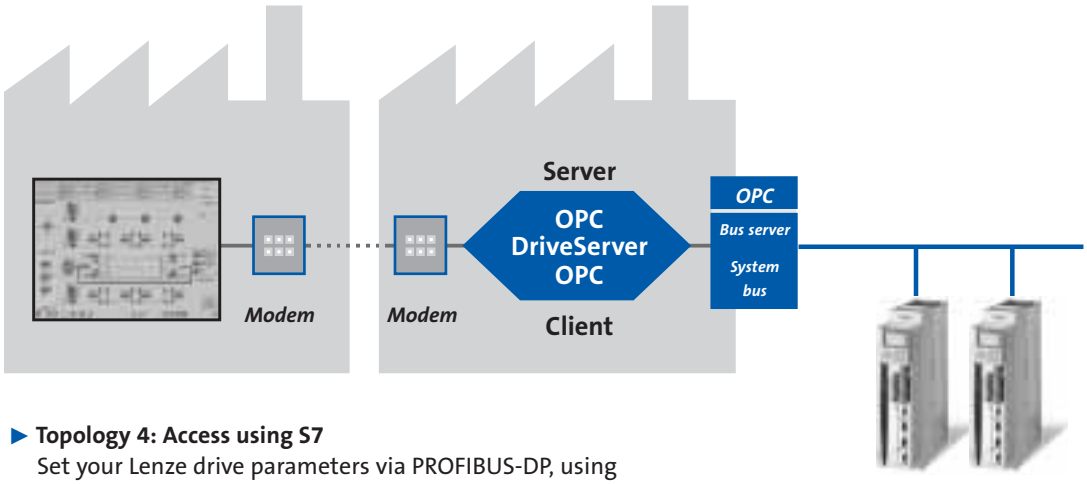
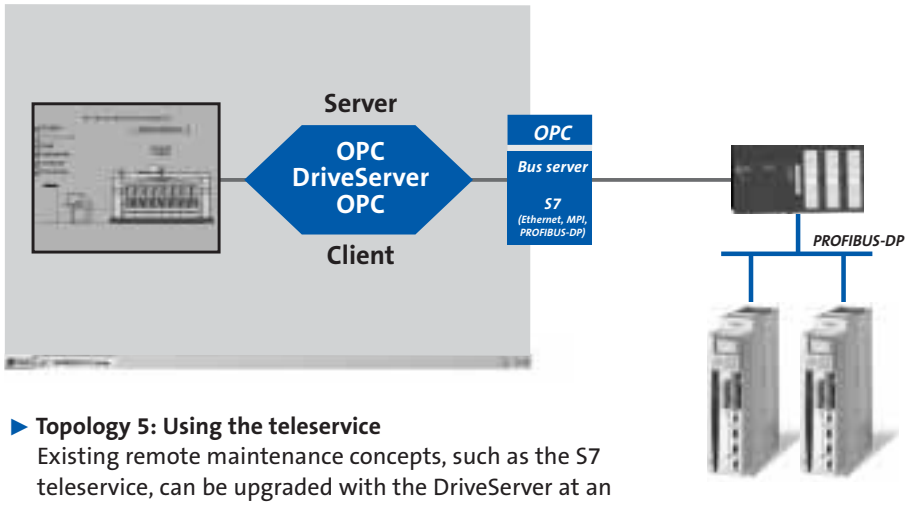
OPC DriveServer

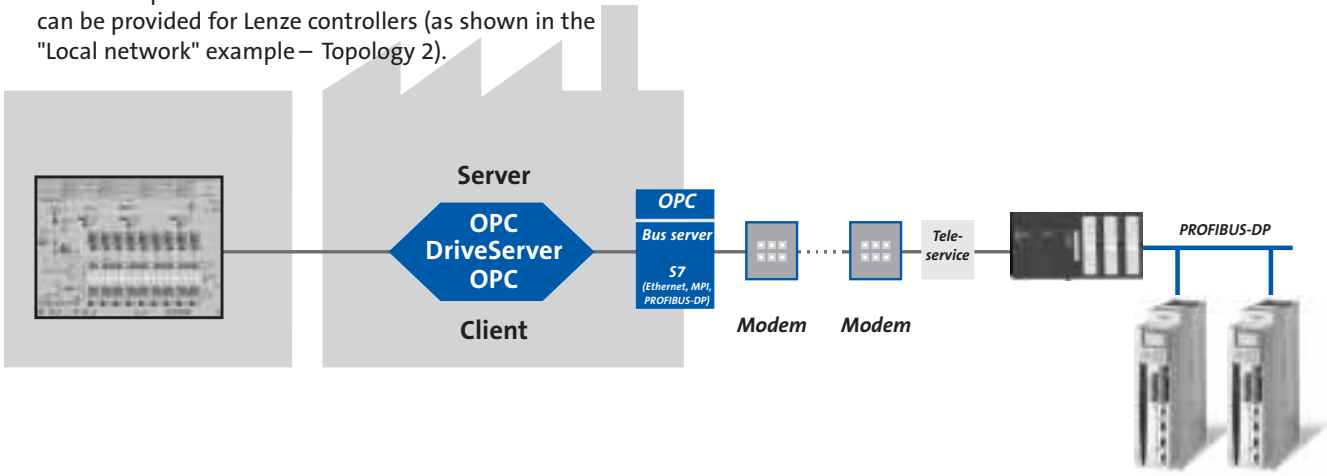
▶ **Topology 3: Local networks, connected via switched connection**
Network communication is also possible if the local network has a modem or ISDN link (remote access service).



▶ **Topology 4: Access using S7**
Set your Lenze drive parameters via PROFIBUS-DP, using the Simatic S7 PLC throughout (as shown in the "single worknode" example – Topology 1). With the new OPC DriveServer S7, you do not need to purchase the Siemens "Prodave" software.



▶ **Topology 5: Using the teleservice**
Existing remote maintenance concepts, such as the S7 teleservice, can be upgraded with the DriveServer at an affordable price. This means that remote maintenance can be provided for Lenze controllers (as shown in the "Local network" example – Topology 2).



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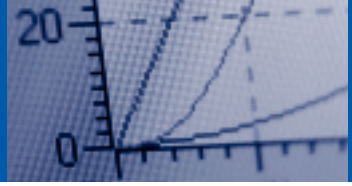

The OPC DriveServer is available in two versions:

	OPC DriveServer V1.1 Used with Lenze controllers	OPC DriveServer S7 V1.1 Used with Lenze controllers via a Simatic® S7
Communication via		
LECOM-A (RS232) via serial interface	●	●
LECOM-B (RS485) via serial interface	with interface converter [1]	with interface converter [1]
System bus (CAN) via USB	with PC system bus adapter (USB) [2]	with PC system bus adapter (USB) [2]
System bus (CAN) via parallel interface	with PC system bus adapter	with PC system bus adapter
When using a Simatic® S7		
MPI	–	with MPI bus adapter [3]
Ethernet	–	with interface module [4]
PROFIBUS-DP	–	with interface module [4]
Functions		
Parameter set transfer	●	●
Program download	●	–
Cam download	●	●
Order no.		
for single user licence	**ESP-DRS1**	**ESP-DRS1-S7**
for multiple user licence	**ESPMDRS1**	**ESPMDRS1-S7**
Languages	German/English	German/English

[1] Possible using one of the intelligent interface converters freely available on the market.
[2] Not valid for Microsoft Windows NT. This operating system does not support USB.
[3] With an appropriate adapter for the MPI bus on Simatic® S7
[4] Standard Simatic® S7 interface modules can be used

Additional ESPMDRS... licences (multiple user licences) can only be purchased in conjunction with a valid ESP-DRS... single user licence.

OPC DriveServer system requirements
In order to be able to use the OPC DriveServer, the following minimum hardware and software requirements must be met:

- Microsoft® Windows® 98/Me, Windows NT® 4.0 SP5 or higher or Windows 2000 SP2 or higher/XP
- IBM-compatible PC with Intel® Pentium®-90 processor
- 64 MB RAM
  (128 MB in Windows 2000/XP)
- 80 MB free hard disk space
- CD-ROM drive
  Free slots/interfaces in accordance with the requirements of the fieldbus interface module to be used

We also recommend the use of a mouse.

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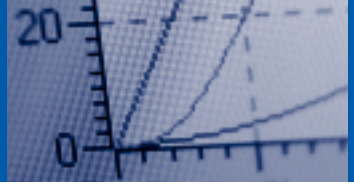

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Global Drive Control
Version 4.6

New version

In modern production facilities, the number of intelligent drive systems which, in addition to their actual drive tasks, also perform technology functions within the production process, is on the increase.

Global Drive Control (GDC) is an easy-to-use and transparent tool for operating, parameter setting and diagnosing drive tasks.

GDC features include:

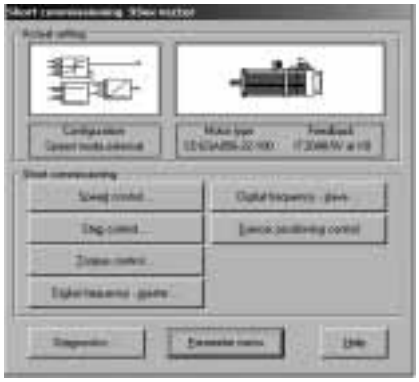
- Quick and easy setup of the drive by means of the short setup function
- Easy operation even for inexperienced users thanks to extensive help functions
- User-friendly diagnostics options via various monitor windows and oscilloscope functions
- Easy drive connection via RS232/485, optical fibres or via the system bus

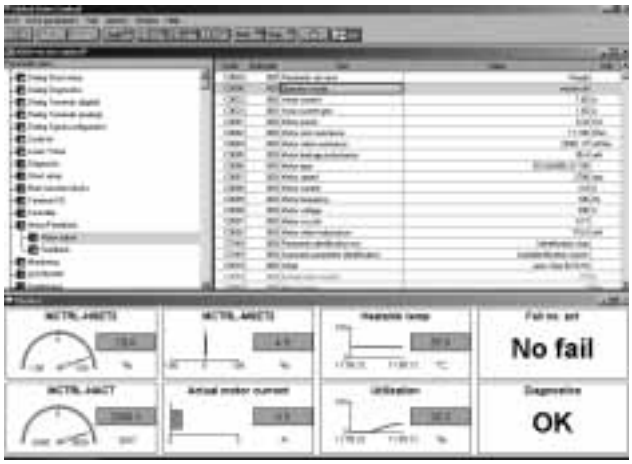
Short setup

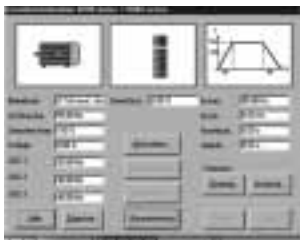
Short setup enables the entire drive to be set up quickly and easily, supported by self-explanatory dialogs. For this purpose, a menu associated with the inverter appears automatically which contains all the necessary operating parameters for the drive train. Inverter-related help functions, which describe the individual parameters in more detail, are always available.

Setup wizard

The setup wizard provides extensive assistance for setting up the 8200 vector and 8200 motec. Once the setup wizard has been called, you will be guided through the inverter parameter setting process step-by-step. All necessary data can be entered in easy-to-use dialogs. The integrated help is visible permanently and describes all necessary steps. It couldn't be easier to start up the inverter.







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Global Drive Control

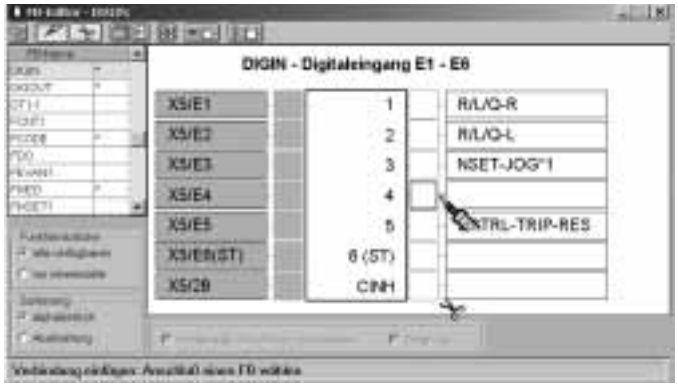
Function block interconnection
GDC also features other transparent dialogs for programming the 9300 Global Drive servo inverter.

The functionality of the inverter is represented in a function block structure which is generated automatically in connection with short setup.

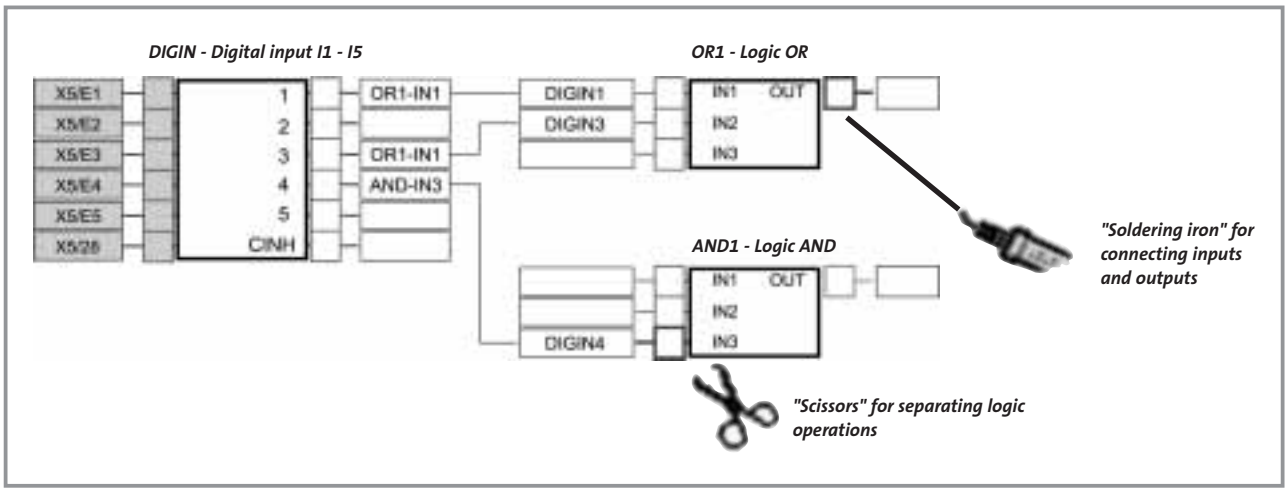
The individual function blocks are made available as logical functional units with inputs and outputs. Programming, for which the function block editor supplied with GDC is used, does not require any programming knowledge.

Example function blocks
- ▶ Logic operations
  - – AND, OR, NOT
- ▶ Interface function:
  - – Digital I/O
  - – System bus
  - – Fieldbus modules
- ▶ Mathematical functions
  - – Arithmetic operations
- ▶ Drive functions:
  - – Brake logic
  - – Position control
  - – Motor control
  - – Electronic gearbox

Advantages
- ▶ Ease of operation
- ▶ No programming knowledge required
- ▶ Extensive function block library with online help



...and this is how programming works



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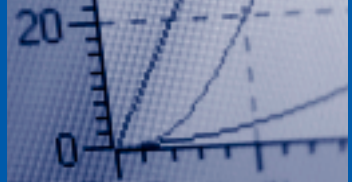


Oscilloscope function

On large systems in particular, it can be difficult to determine speeds or torques on individual drives. However, it is knowledge of precisely these values which can make setting up these machines much easier.

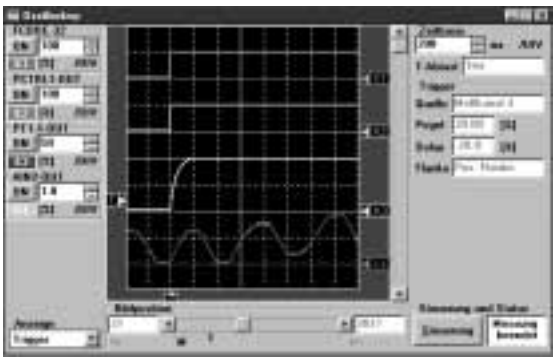
The built-in oscilloscope functions in GDC for the servo inverter mean that it is no longer necessary to connect and install complex measuring instruments - the controller itself is the comprehensive measuring instrument for all measured variables affecting the drive.

Advantages

- Precise detection of drive-specific process factors with no need for additional measuring devices
- No need to install temporary measuring sensors in the system
- User-friendly documentation when fine-tuning control loops
- Easy maintenance and troubleshooting

Features

- Measurement of any analog signal
- Measurement of up to four independent channels at the same time
- Triggering on any digital or analog signal
- Pre-triggering and post-triggering
- Cursor and zoom function for analysing measurements
- Variable time per scan
- Overlap function makes it easy to compare measurements
- Messages can be loaded, stored, annotated and printed



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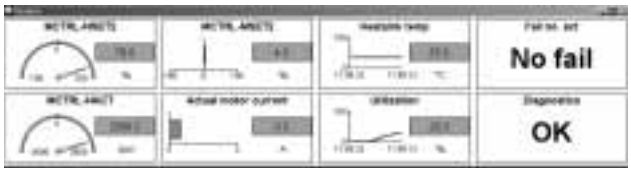
Global Drive Control

Diagnostics

As well as extensive oscilloscope options, the software also features a range of quick and easy-to-use built-in diagnostic options. Up to 8 values from the inverter can be displayed in the monitor window simultaneously. The values displayed can be freely selected and it is possible to switch between pointer instrument, bar graph, etc.

Dialog monitors can also be called for the 8200 vector and 8200 motec. These indicate the states of the input and output terminals and various bus modules. All drive data can therefore be displayed in transparent format during commissioning. This makes troubleshooting significantly easier and reduces commissioning times.



Global Drive Control system requirements

In order to be able to use Global Drive Control, the following minimum hardware and software requirements must be met:

- Microsoft® Windows® 95/98/Me, Windows NT® 4.0 SP5 or higher or Windows 2000 SP2 or higher/XP
- IBM-compatible PC with Intel® Pentium®-90 processor
- 128 MB RAM
- 180 MB free hard disk space
- CD-ROM drive
- Internet Explorer Version 5 or higher
- Free slots/interfaces in accordance with the requirements of the fieldbus interface module to be used

We also recommend the use of a mouse.

Scope of functions

GDC incorporates all of the functions described here and is suitable for both 8200 range frequency inverters and 9300 range servo inverters.

GDC easy has been developed specifically for 8200 range frequency inverters. The table below provides an overview of its functions.

	GDC easy V4.7 Free software for operating, parameter setting, commissioning and diagnosing	**GDC V4.6** A full version is available for operating, parameter setting, commissioning and diagnosing
Communication		
LECOM-A (RS232) via serial interface	●	●
LECOM-B (RS485) via serial interface	with interface converter [1]	with interface converter [1]
LECOM-LI (optical fibre) via serial interface	with optical fibre/RS232 converter	with optical fibre/RS232 converter
System bus (CAN) via USB	with PC system bus adapter (USB) [2]	with PC system bus adapter (USB) [2]
System bus (CAN) via parallel interface	with PC system bus adapter	with PC system bus adapter
OPC DriveServer (bus server)	●	●

[1] Possible using one of the intelligent interface converters freely available on the market

[2] Not valid for Microsoft® Windows® NT. This operating system does not support USB

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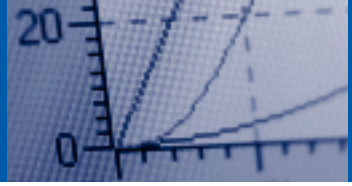

Scope of functions

	GDC easy V4.7 Free software for operating, parameter setting, commissioning and diagnosing	GDC V4.6 A full version is available for operating, parameter setting, commissioning and diagnosing
Code lists, access to all parameters		
starttec	●	●
8200	●	●
8200 vector/8200 motec	●	●
9300 vector	●	●
9300 servo controller	●	●
Drive PLC/9300 Servo PLC	● [1]	● [1]
Terminal extension	●	●
Decentralised IP20 I/O system	●	●
Function block editor		
8200 vector/8200 motec	–	●
9300 vector	–	●
9300 servo controller	–	●
Short setup dialogs		
starttec	●	●
8200	●	●
8200 vector/8200 motec	●	●
9300 vector	–	●
9300 servo controller	–	● [2]
Assisted setup for the 8200 vector/8200 motec	●	●
Motor dialogs	●	●
Monitor window	●	●
Input/output diagnostics on the 8200 vector/8200 motec	●	●
Oscilloscope functions		
9300 vector	–	●
9300 servo controller	–	●
Languages	German/English	German/English
Additional programs included on the CD:		
GD Oscilloscope V1.2	–	●
GD Loader V1.2	●	●
Order no.		
for single user licence	Corporate licence can be downloaded free of charge from www.Lenze.com	**ESP-GDC2**
for multiple user licence		**ESPMGDC2**

[1] PLC program variables can be declared as parameters and then parameterised via GDC
[2] Not valid for the 9300 servo register controller

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CamDesigner Professional

Key features of cam technology include high machine clock cycle numbers, high levels of accuracy and the best possible protection of mechanical systems. However, electronic cams add another vital ingredient: flexibility. Among other things, an electronic cam will allow you to swap profiles very quickly, making it very easy to optimise motion applications.

With CamDesigner Professional, you can quickly create and optimise motion profiles for electronic cams.

Operation of CamDesigner Professional is intuitive and has been designed so that machine operators can use the tool. Whether you are importing data from a CAD or inputting profiles directly, CamDesigner Professional can support users throughout the motion profile creation process.

Motion profiles can be entered very easily in graphic format using the mouse as a tool in CamDesigner Professional. Simply enter the parts of the motion profile which are actually relevant. If required, CamDesigner Professional will then automatically create the motion profiles in accordance with the motion principles of VDI 2143 and optimise them in terms of acceleration and speed. The motion profiles of other tools (individually or in groups) can be displayed in the background in order to optimise and facilitate the input of movements.

This means that the user can see all motion profiles and very easily match one to another and assess potential collision risks.

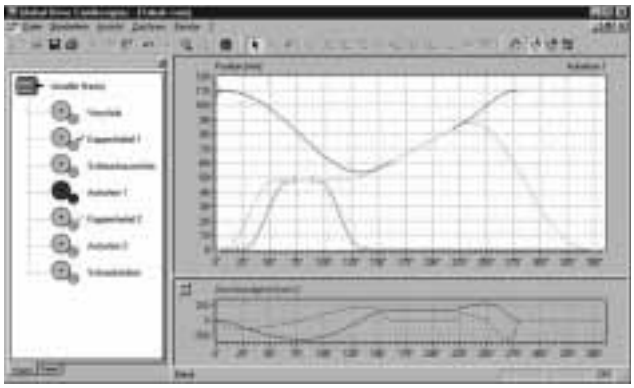
Even complex motion profiles can be created very easily using the "combinatorial axes" function, e.g. for controlling a milling tool which is synchronised with a moving wooden panel before cutting an outline into it. This means that the user can divide a complex motion task into as many simple indexing movements as required and input the task in this simplified format. CamDesigner expands these indexing movements and can if required combine them to create a motion profile.

In this way, up to 8 motion profiles can be created for the 9300 servo cam 9300 EK. The curve data are transferred to the drive controller with the aid of the "Global Drive Control" PC software or via the "CamLoader".

The CamManager tool is also integrated for easy management of all data. CamManager automatically guides the user through all of the necessary inputs and makes all data available again at the click of a mouse. All of the required data are then automatically transferred to the CamDesigner Professional, and processing of motion profiles can start straight away.

Note

Easy mathematical input of motion profiles is possible with the curve editor included in the "Global Drive Control". Processing takes place here on an exclusively axis-related basis, as does the representation of the curves.



CamDesigner Professional system requirements

In order to be able to use the CamDesigner Professional program, the following minimum hardware and software requirements must be met:

- Microsoft®Windows® 98/Me, Windows NT® 4.0 (ServicePack 5 or higher), Windows 2000 (ServicePack2 or higher) or Windows XP
- IBM-compatible PC with Intel® Pentium®-90 processor
- Super VGA screen
- 64 MB RAM, 128 MB RAM (XP, 2000)
- 70 MB free hard disk space
- CD-ROM drive
- Parallel interface for connecting the copyright dongle

We also recommend the use of a mouse.

Product designation	Order designation
CamDesigner Professional	ESP-CAM1-P
Communication via parallel port (LPT port) PC system bus adapter 2173 incl. connecting cable and voltage supply adapter	
- for DIN keyboard connection	EMF2173IB
- for PS/2 keyboard connection	EMF2173IBV002
- for PS/2 keyboard connection electrically isolated	EMF2173IBV003,
Communication via USB* (Universal Serial Bus) PC system bus adapter 2177	EMF2177B

* Not valid for Microsoft® Windows® NT. This operating system does not support USB

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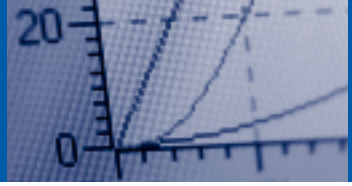

CamLoader

CamLoader offers an ideal expansion of the CamDesigner Professional for applications in which ...

- the curve profiles are generated with a CAD system, and the only remaining task is to download the tables of points.
- standard machines are to be taken into operation with electronic cams and only a download is to be performed.
- frequent optimisation or modifications to the curve profiles are required, e.g. as a result of changing modes.

CamLoader can be used both as Engineering Software on the PC and as Runtime Software on the industrial PC of the machine.

CamLoader is easy to operate via the user-friendly interface, and it can also be controlled on the machine via script files (batch mode).

The functional scope has been deliberately kept simple, so that the user does not require any specialised knowledge of cam technology or the use of CamDesigner Professional.

This makes life easier even for the programmer, as CamLoader already contains all the routines required for data management, data conversion and downloading. As a result, the programmer will not even need to think about the interfaces to the drive controller.

Installation on the industrial PC is quick and easy. CamLoader can also automatically generate the required script files needed to control it on the industrial PC if required.

Product designation	Order designation
CamLoader V1.0 CD, full version	ESP-CAL 1
CamLoader V1.0 Multi-user licence	ESPMCAL 1

CamLoader system requirements

In order to be able to use the CamLoader program, the following minimum hardware and software requirements must be met:

- Microsoft®Windows® 98/Me, Windows NT® 4.0 (ServicePack 5 or higher), Windows 2000 (ServicePack2 or higher) or Windows XP
- IBM-compatible PC with Intel® Pentium®-90 processor
- 64 MB RAM,
- 70 MB free hard disk space
- Pointer device (mouse, trackball etc.)
- Free slots/interfaces in accordance with the requirements of the fieldbus interface module to be used

Connection to the target system

For communication with the target system (servo inverter 9300 EK, 9300 ServoPLC or Drive PLC) you will require a fieldbus-specific interface module for the PC, as well as the matching fieldbus modules for the target systems to be connected.

For communication via the system bus (CAN), Lenze offer the following components as an interface module for the PC:

Product designation	Order designation
Communication via parallel port (LPT port) PC system bus adapter 2173 incl. connecting cable and voltage supply adapter - for DIN keyboard connection - for PS/2 keyboard connection - for PS/2 keyboard connection electrically isolated	 EMF2173IB EMF2173IBV002 EMF2173IBV003,
Communication via USB* (Universal Serial Bus) PC system bus adapter 2177	EMF2177B

* Not valid for Microsoft® Windows® NT. This operating system does not support USB

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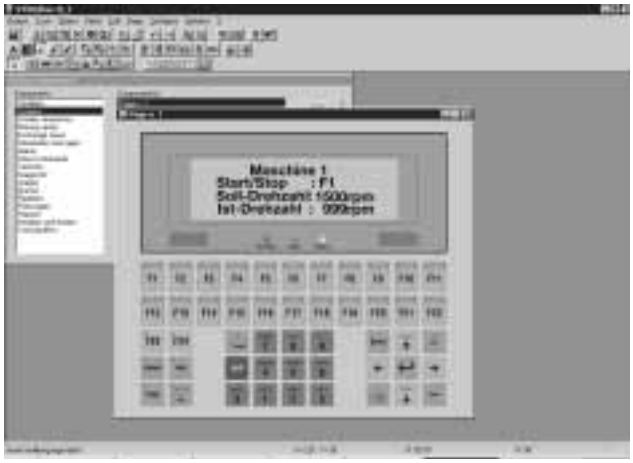
HMI Designer
Version 1.6

New version

The transparent programming environment and optimum adaptation to Lenze controller makes creating a project on the operator terminal as easy as using it later.

This tool can be used to export and import any text for simple translation into other languages. Once created, variables and recipes can be transferred to other devices in the HMI range.



HMI Designer system requirements

Hardware:

- Microsoft® Windows® 95/98/NT 4.0 SP5 or higher/2000/XP
- IBM-compatible PC (Pentium® 166 processor or higher)
- 32 MB RAM
- 100 MB free hard disk space
- CD-ROM drive
- Free serial interface

We also recommend the use of a mouse.

	HMI Designer
Communication via	
serial interface	● (download cable supplied with the software)
Languages	German/English
Order no. (corporate licence)	**ESP-HMI1-P**

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Global Drive Loader
Version 2.1

New version

The Global Drive Loader (GD Loader) makes standard setup significantly easier. It is very easy to use, as there is no need for a development environment or parameter settings. Compiled PLC programs (files from the Drive PLC Developer Studio) and parameter set files (files from Global Drive Control) can simply be transferred from the PC to the target system. As these files cannot be modified with GD Loader, this prevents data being tampered with by unauthorised users.

The advantages for you
- Dedicated program for setting up inverters in standard machines
- Data cannot be tampered with
- Simplest possible operation without development environment
- Automatic batch mode provides a quick and easy way of transferring a variety of files to a number of target systems
- Software is free of charge

You can continue to use the following software products to modify and create files:
- Drive PLC Developer Studio V1.0 or higher
- Global Drive Control V4.31 or higher

The latest version of GD Loader can be downloaded free of charge from the Downloads area at www.Lenze.com. A GD Loader is also supplied on the CDs for the following software products. Depending on the version, CDs may not contain the latest version of GD Loader.
- Drive PLC Developer Studio V2.0 or higher
- Global Drive Control V4.5 and higher
- Global Drive Control easy V4.5 or higher

Target systems
GD Loader V2.1 can be used for the following target systems:
- 8200 vector/8200 motec
- 9300 Servo PLC
- Drive PLC
- Terminal extension
- ECS servo system

Global Drive Loader system requirements
In order to be able to use the Global Drive Loader, the following minimum hardware and software requirements must be met:
- Microsoft® Windows® 98/Me, Windows NT® 4.0 SP5 or higher or Windows 2000 SP2 or higher/XP
- IBM-compatible PC with Intel® Pentium®-90 processor
- 32 MB RAM
- 15 MB free hard disk space
- CD-ROM drive for CD version
- Free slots/interfaces in accordance with the requirements of the fieldbus interface module to be used
- Mouse

	GD Loader V2.1
Communication via	
System bus (CAN) via USB	with PC system bus adapter (USB) [1]
System bus (CAN) via parallel interface	with PC system bus adapter
Languages	German/English/French
Order no.	Corporate licence can be downloaded free of charge from www.Lenze.com

[1] Not valid for Microsoft® Windows® NT. This operating system does not support USB

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Industrial communication

9300 servo inverter

Overview of bus systems

3-2

Communication modules

CANopen/Lenze system bus 3-4
DeviceNet 3-6
PROFIBUS-DP 3-8
INTERBUS 3-10
INTERBUS Loop 3-12
LON 3-13
LECOM-A (RS232)/LECOM-B (RS485) 3-14
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System bus components

PC system bus adapter 3-18
CAN repeater 3-19
CAN addressing module 3-19

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	Features of the bus systems							
	Topology	**Bus administration**	**Max. no. of stations (master and slaves)**	**Max. distance betw. stations without repeater**	**Max. distance betw. stations with repeater**	**Possible transfer medium**	**Auxiliary power supply via bus cable**	
CAN/CANopen	Line with terminating resistors	Multi-master	64	Depends on the baud rate used and module used; approx. 1 km at 50 kBaud; approx. 25 m at 1 MBaud	General reduction in length; depends on the repeater used	Shielded twisted 2-wire cable	Possible via separately via additional cables in the bus cable	
DeviceNet	Line with terminating resistors	Single-master	64	100 m (500 kBaud); 250 m (250 kBaud); 500 m (125 kBaud)	Not specified	Shielded twisted 2-wire cable	Separate via additional cables in the bus cable	
PROFIBUS-DP	Line with terminating resistors	Single-master	124 (4 segm., 3 repeaters), max. 32 per segm.	1.2 km (93.75 kBaud); 100 m (12 MBaud)	10 km (93.75 kBaud)	Shielded twisted 2-wire cable	Separate via additional cables in the bus cable	
INTERBUS	Ring	Single-master	512 slaves, 1 master	1.5 m (local bus); 400 m (remote bus); 2.5 km optical fibre	13 km (remote bus); 100 km optical fibre	Shielded twisted 5-wire cable optical fibre,infrared	Separate, group via bus terminal (remote bus)	
INTERBUS Loop	Ring	Only in conjunction with INTERBUS-S; single-master (bus terminal)	32 slaves	10 m (max. 100 m cable length without repeaters)	No repeaters required	Unshielded twisted 2-wire cable	Power supply via data line (approx. 1.5 A)	
LON	Line (2-wire) or any	Multi-master	32385 stations distributed on 255 sub-networks each with 127 stations	2 km at 78 kBaud (twisted pair); 6.1 km at 5.48 kBaud (optical fibre plastic)	Almost any; can be expanded using sub-networks (no repeaters)	Unshielded untwisted 2-wire cable (radio); optical fibre, network (Powerline)	Possible separately via additional cables in the bus cable	

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						Lenze communication modules
	Transfer rate	**Typical update time (e.g. 8 stations 4 bytes of user data**	**Message length (user data)**	**Message length (total)**	**Bus access method**	**9300 Servo inverter/ 9300 Servo PLC**
	10 kBaud to 1 MBaud	Approx. 1.32 ms at 1 MBaud (high priority)	0 to 8 bytes	106 bits for 8 bytes of user data	CSMA/CA message-based	On-board (only parts of CANopen); CANopen EMF2175IB (pluggable)
	125, 250, 500 kBaud	Approx. 2.64 ms at 500 kBaud (high priority)	0 to 8 bytes	106 bits with 8 bytes of user data	CSMA/CA message-based	EMF2175IB (pluggable)
	9.6 kBaud to to 12 MBaud	Approx. 2.5 ms at 500 kBaud	0 to 246 bytes	User data + 6 to 11 bytes	Cyclic polling	EMF2133IB (pluggable)
	500 kBaud or 2 MBaud	Min. 2 ms (process data)	1 to 64 bytes of data, up to 246 bytes of parameters	User data + 6 bytes	Frame/ distributed shift register	EMF2113IB (pluggable)
	500 kBaud	Min. 2 ms (process data)	1 to 64 bytes of data, up to 246 bytes or parameters	User data + 6 bytes	Frame/ distributed shift register	EMF2112IB (pluggable)
	78 kBaud to 1.25 MBaud	Approx. 70 ms	1 to 228 bytes, typically approx. 11 bytes	Max. 255 bytes, User data + 27 Byte	Modified CSMA/CD	EMF2141IB (pluggable)

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CANopen/Lenze system bus

The system bus (CAN) is used for communication between Lenze devices and provides a quick and easy means not only of connecting a number of inverters but also of establishing connections to other external add-on components such as operator/display terminals.

The following are examples of functions the system bus can add to the controller:

- Parameter setting
- Data transfer between inverters
- Connection to external controllers and host systems
- Option to connect to:
  - Decentralised I/O systems
  - Operator/display terminals

EMF2175IB:
The EMF2175IB module supports the CANopen communication profile to DS301 V4.01. The node address and baud rate are set via a DIP switch. (The DIP switch can also be used to change the communication profile over to DeviceNet.)

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General data and operating conditions

Communication profile	▶ CANopen compatible to DS301 V4.01: EMF2175IB						
Communication medium	DIN ISO 11898						
Network topology	Line (terminated at both ends with 120 Ω)						
Number of logical process data channels	**AIF:** 2175:3						
Number of logical parameter data channels	2						
Bus stations	Slave (CANopen), multi-master (Lenze system bus)						
Max. number of stations	63						
Max. distance between two stations	Unlimited, determined by max. bus length						
Baud rate [kBps]	10	20	50	125	250	500	1000
2175: Max. bus length [m] [1)]	7450	3950	1550	630	290	120	25
DC voltage supply	Internal and external possible (if the controller fails, the bus system will continue to operate)						
Ambient temperature	**AIF:** Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: -20 ... +55°C						
Climatic conditions	Class 3K3 to EN 50178 (without moisture condensation, average relative humidity 85%)						
Can be used on	EV□93□□-□□: EMF2175IB						
Order no. for AIF	**EMF2175IB**						

[1)] You should be aware of the additional effect of the number of devices and the cable cross-section used on the maximum bus cable lengths.

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DeviceNet

The DeviceNet fieldbus has been particularly successful in the American and Asian markets. The DeviceNet module can function in two operating modes - DeviceNet and CANopen.

The DIP switch on the front panel of the function module can be used to make the following settings:

- Station address
- Baud rate

The DIP switch can be used to change over from the DeviceNet communication profile to CANopen and vice versa.

EMF2175IB:
DeviceNet communication module with pluggable terminal strip

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General data and operating conditions

Communication medium	DIN ISO 11898		
Communication profile	DeviceNet		
Baud rate [kBps]	125	250	500
Max. bus length [m] **EMF2175IB**	500	250	100
DeviceNet station	Slave		
Network topology	Line with terminating resistors (120 Ω)		
Process data words (PZD) (16 bits)	12		
Number of stations	Max. 63		
DC voltage supply	▶ Internal ▶ External – Only necessary if bus stations which have been disconnected from the mains need to maintain communication with the master – Supplied via terminal connectors with a separate DC voltage supply, +24 V ± 10%; max. 100 mA		
Ambient temperature	Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: -20 ... +55°C		
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)		
Can be used on	EV□93□□-□□: EMF2175IB		
Order no. for AIF	**EMF2175IB**		

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PROFIBUS-DP

The PROFIBUS module is a slave connection module with the PROFIBUS-DP communication profile. It is used for networking between the controller and inverter at high processing speeds. It provides a user-friendly way of integrating the inverter into the overall system network.

All modules are electrically isolated from the bus.

EMF2133IB:
The address is set via a DIP switch. In addition, the function - and therefore the code - of the EMF2131IB (predecessor of the 2133IB module) can also be activated.

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General data and operating conditions

Communication medium	RS485
Communication profile	PROFIBUS-DP (DIN 19245 Part 1 and Part 3)
Selectable drive profile	▶ DRIVECOM profile "Drive technology 20" ▶ PROFIDRIVE (EMF2133IB only) ▶ Lenze device control
Baud rate [kBps]	9.6 ... 12000 (automatic detection)
PROFIBUS-DP station	Slave
Network topology	No repeaters: Line With repeaters: Line or tree
Process data words (PZD) (16 bits)	**AIF**: 2133: 1 ... 12
DP user data length	Parameter channel (4 words) + process data words
Number of stations	Standard: 32 (= 1 bus segment) With repeaters: 125 (slaves)
Max. cable length per bus segment	1200 m (depending on the baud rate and the type of cable used)
DC voltage supply	▶ Internal ▶ External – only necessary if bus stations which have been disconnected from the mains need to maintain communication with the master – Bus stations with activated bus terminating resistor are disconnected from the mains but the bus system is to remain active – Power is being provided via a separate power supply – +24 V DC ± 10%, max. 120 mA
Ambient temperature	**AIF:** Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: -20 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EV□93□□-□□: EMF2133IB
Order no. for AIF	**EMF2133IB**

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INTERBUS

INTERBUS is connected directly to the remote bus. The DRIVECOM profile 20 or 21 is supported for this connection. An external DC voltage (24 V) can be connected to the modules. This means that the fieldbus will continue to operate even if the controller is disconnected from the mains.

EMF2113IB:
DIP switches for setting process data and PCP data are located on the module.
In addition to the functions of the EMF2111IB, the EMF2113IB module offers other options such as transferring a maximum of 10 process data words. The module is electrically isolated from the incoming bus.

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General data and operating conditions

Communication medium	RS485
Selectable drive profile	▶ Lenze device control ▶ DRIVECOM profile "Drive technology 21"
Baud rate [kBps]	500 kBaud, 2 MBaud
INTERBUS station	Slave
Network topology	Ring (go and return lines in the same bus cable)
Process data words (PZD) (16 bits)	EMF2113IB: max. 10
Parameter data words (PCP) (16 bits)	1, 2 or 4 words
Maximum PDU length	64 bytes
PCP services supported	Initiate, Abort, Status, Identify, Get-OV-Long, Read, Write
Number of stations	Depends on host system (I/O area), max. 63
Max. distance between 2 stations	400 m
DC voltage supply	▶ Internal ▶ External – only necessary if the communication ring must not be interrupted if a bus station is switched off or fails – Power is being provided via a separate power supply – +24 V DC ± 10%, max. 150 mA
Ambient temperature	**AIF:** Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: 0 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EVx93□□-□□: EMF2113IB
Order no. for AIF	**EMF2113IB**

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INTERBUS Loop

The INTERBUS Loop is used in conjunction with INTERBUS.
The protocol used is identical to INTERBUS, although power is supplied directly via the bus.

General data and operating conditions

Communication medium	RS485
Selectable drive profile	Lenze device control DRIVECOM profile "Drive technology 20"
Baud rate [kBps]	500
Network topology	Ring
Process data words (PZD) (16 bits)	2 words
Parameter data words (PCP) (16 bits)	Not supported
INTERBUS code (ID code)	Decimal: 179; hex: B3
Maximum PDU length	4 bytes
PCP services supported	None
Number of stations	Depends on the current consumption (max. 36 Lenze drives)
Max. distance between 2 nodes	20 m
DC voltage supply	Via the bus
Ambient temperature	Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: -20 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EVx93□□-□□
Order no. for AIF	**EMF2112IB**

EMF2112IB

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LON

The communication module enables the inverter to support the LONMARK "Variable Speed Motor Drive" functional device profile.

- In order that the new LON station can be integrated quickly, a service button is located on the LON module. Press this button to register the new LON station on the network so that it will be detected by all other stations.

Note:

- A configuration diskette for LON containing the description file for the devices and the pluggable for the LonMaker software is included in the scope of supply.

General data and operating conditions

Communication medium	FTT (Free Topology Transceiver) - 10 A
Communication profile	LONMARK® "Variable Speed Motor Drive" functional profile
Network topology	Free topology (line, tree/line, star, ring)
Possible number of nodes	64
Max. cable length	2700 m for bus topology (line) 500 m for mixed topology
Baud rate [kBps]	78
Electrical connection	Pluggable screw terminal
DC voltage supply	▶ Internal ▶ External – Only necessary if a bus station is switched off or fails but communication with this station needs to be maintained – Power is being provided via a separate power supply – +24 V DC ± 10%, max. 120 mA per module
Ambient temperature	Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: 0 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EVS93□□-□□
Order no.	**EMF2141IB**

EMF2141IB

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LECOM-A (RS232)/LECOM-B (RS485)

The Lenze LECOM protocol is used for communication via LECOM-A (RS232)/LECOM-B (RS485) bus modules. This protocol is open to the user. It is supplied as an integral component of a number of systems (e.g. Simatic S5).

These modules are electrically isolated not only from the bus but also from the external voltage supply:

EMF2102IBCV001:
Supports LECOM-A (RS232) and LECOM-B (RS485).

EMF2102IBCV002:
Supports LECOM-B (RS485).

EMF2102IBCV004:
Supports LECOM-A (RS232) and uses only the basic device internal voltage supply.

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General data and operating conditions

Communication medium	RS232 (LECOM-A), RS485 (LECOM-B)
Communication protocol	LECOM-A/B V2.0
Transfer character format	7E1: 7 bits ASCII, 1 stop bit, 1 start bit, 1 parity bit (even)
Baud rate [kBps]	1200, 2400, 4800, 9600, 19200
LECOM station	Slave
Network topology	No repeaters: Line With repeaters: Line or tree
Max. number of stations	31 (= 1 bus segment) + 1 master With repeaters: 90
Max. cable length per bus segment	1200 m (depending on the baud rate and the type of cable used)
DC voltage supply	▶ Internal ▶ External – Necessary if bus stations which have been disconnected from the mains need to maintain communication with the master – Bus stations with activated bus terminating resistor are disconnected from the mains but the bus system is to remain active – Power is being provided via a separate power supply – +24 V DC ± 10%, max. 80 mA
Ambient temperature	**AIF:** Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: -20 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EVx93□□-□□
Order no. for AIF	**EMF2102IBCV001** **EMF2102IBCV002** **EMF2102IBCV004**

LECOM-A accessories

System cables of various lengths are available for connecting a LECOM-A module to the RS232 interface of a PC.

Order no. for PC system cable (RS232, 5 m)	**EWL0020**
Order no. for PC system cable (RS232, 10 m)	**EWL0021**

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LECOM-LI

The Lenze LECOM protocol is used for communication via the LECOM-LI bus module. Data is transmitted via optical fibres, which means that transmission is particularly stable when subject to external interference.

The LECOM protocol is open for the user.
It is an integral component of a number of systems (e.g. Simatic S5).

The module is electrically isolated from the external voltage supply.

General data and operating conditions

Communication medium	Optical fibre
Communication protocol	LECOM-A/B V2.0
Transfer character format	7E1: 7 bits ASCII, 1 stop bit, 1 start bit, 1 parity bit (even)
Baud rate [kBps]	1200, 2400, 4800, 9600, 19200
LECOM station	Slave
Network topology	Ring
Max. number of stations	52
Max. cable length per bus segment	0 ... 40 m (standard output power)/10 ... 66 m (increased output power)
Electrical connection	Screw-type crimp connection
DC voltage supply	▶ Internal ▶ External – only necessary if the communication ring must not be interrupted if a bus station is switched off or fails – Bus stations with activated bus terminating resistor are disconnected from the mains but the bus system is to remain active – Power is being provided via a separate power supply – +24 V DC ± 10%, max. 70 mA
Ambient temperature	Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: 0 ... +55°C
Climatic conditions	Class 3K3 to EN 50178 (no moisture condensation, average relative humidity 85%)
Can be used on	EVx93□□-□□
Order no. for AIF	**EMF2102IBCV003**

EMF2102IBCV003

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LECOM-LI accessories

As only a very small number of hosts have an optical fibre connection, Lenze can supply an optical fibre adapter.

This optical fibre adapter should be connected directly to the host's RS232 interface.

General data and operating conditions

Communication medium	To bus: optical fibre; to host computer: RS232
Max. cable length EMF2125IB	0 ... 40 m between 2 optical fibre stations
Max. cable length EMF2126IB	30 ... 66 m between 2 optical fibre stations
DC voltage supply max. 70 mA	Voltage supply via a power supply, order no. 362 016 for EMF2125IB and EMF2126IB; 9 V unstabilised or 9 ... 12 V stabilised;
Optical fibre plug connection	Crimp connection for optical fibre cable with 2.2 mm outer diameter
Ambient temperature	Transport: 0 ... +45°C Storage: 0 ... +45°C Operation: 0 ... +45°C
Climatic conditions	10 ... 90% rel. humidity; no condensation
Order no.	**EMF2125IB; EMF2126IB**
Order no. for optical fibre cable with PE sleeve	**EWZ0007** (thermoplastic polyester)
Order no. for optical fibre cable with PUR sleeve	**EWZ0006** (thermoplastic polyurethane; designed for installation outside the control cabinet)

EMF2125IB optical fibre adapter

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PC system bus adapter

The PC system bus adapter provides a quick and easy means of connecting the PC for setting parameters on and programming the controller to the Lenze system bus (CAN).

For the printer port
This adapter simply plugs into the PC's parallel port. The relevant drivers are installed automatically with the appropriate Lenze software. Depending on the version, the voltage supply is provided via the DIN or PS2 connection on the PC.

Order no.	Brief description
EMF2173IB [1]	System bus adapter; voltage supply via DIN connection on PC
EMF2173IB V002 [1]	System bus adapter; voltage supply via PS2 connection on PC
EMF2173IB V003 [1]	System bus adapter; voltage supply via PS2 connection on PC; electrically isolated from the CAN bus

EMF2173IB V003

For the USB port
This adapter simply plugs into the PC's USB port. The relevant drivers are installed automatically with the appropriate Lenze software. The voltage supply is USB port on whichever PC/laptop is used.

Order no.	Brief description
EMF2177IB [1]	USB system bus adapter; voltage supply also provided via the USB connection on the PC; electrically isolated from the CAN bus as standard

[1] A CAN connecting cable (5 m) is included in the scope of supply

EMF2177IB

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CAN repeater

The CAN repeater can be used to electrically isolate two segments on a CAN network and to access CAN communication partners during operation (service interface).

This repeater can isolate a faulty CAN segment from the rest of the network. The rest of the stations on the network can continue to operate. Once the fault has been eliminated, the segment concerned can be reconnected to the CAN network.

Due to the physical features of the CAN bus, the use of a CAN repeater does not increase the maximum network area. However, the overall area of the network can be expanded by selecting an appropriate topology.

Star and tree topologies can be set up using the repeater.

Communication medium	DIN ISO 11898
Baud rate	Up to 500 kbps
Signal runtime in repeater	Approx. 150 ns from CAN1 to CAN2, thereby reducing the maximum bus length by approx. 30 m
Voltage supply	9 ... 35 V DC, 150 mA typical
Ambient temperature	Transport: -25 ... +70°C Storage: -25 ... +60°C Operation: 0 ... +55°C
Dimensions	Approx. 110 x 75 x 22 mm
Other features	▶ CAN1 and CAN2 are electrically isolated from the voltage supply via DC/D converters ▶ CAN1 is electrically isolated from CAN2 ▶ Terminating resistors are integrated in the repeater in CAN1 and in CAN2
Order no.	**EMF2176IB**

EMF2176IB

CAN addressing module

The CAN addressing module is used to set the controller address and baud rate of the Lenze system bus for 8200 vector and 9300 controllers (incl. all technology variants).

Additional features	The controller address and baud rate are set by: ▶ Encoding the 9-pin SUB-D plug (appropriate connections must be established) ▶ Setting the miniature switch in the addressing module
Order no.	**EMF2174IB**

EMF2174IB

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info
Help

Human machine interface

9300 servo inverter

Visualisation made easy

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Visualisation made easy

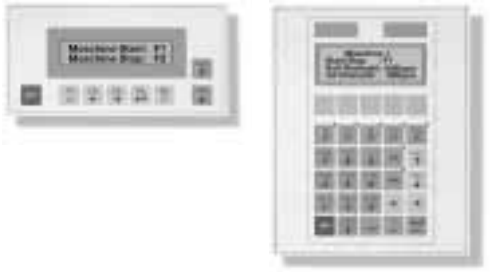
Requirements of today's machines and systems in terms of efficiency and effectiveness are constantly on the increase. User-friendliness and monitoring reliability for complex machines are characteristics which are beginning to dominate. Lenze can provide a wide range of human machine interface products, from text displays to graphics displays and beyond to touch screen units, with just one software program common to all: the HMI Designer.

Select a multiplicity of functions according to device type, e.g.:

- Display of text, images, bar graphs, bitmaps and animated graphics
- Recipe management
- Display of system and alarm messages
- Windows fonts
- Automatic operations
- Communication via Lenze system bus

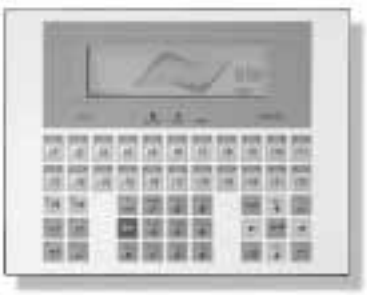
Text displays

Text displays are a low-cost and compact solution for simple applications. Their narrow mounting depth makes them ideal if space is at a premium. The displays, which have between two and four lines, are backlit and feature a system bus as standard as well as various system and function keys.



Graphics displays

Graphics displays combine cost-effectiveness, functionality and maximum user-friendliness in a modern design.
The compact units with built-in system bus are able to manage recipes and display data in graphic format.
Production trends are immediately apparent, enabling machine processes to be optimised.



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Touch screens

Our range of touch screens can cater for all users, whether you are just starting out and are looking for a budget solution or need an advanced solution for more complex visualisation applications, in which case our 10.4" TFT will be ideal. All units are fitted with a system bus and boast an incredibly flexible user interface.

HMI Designer *

One software program for all units: The HMI Designer creates an integrated development environment for all human machine interfaces described. The transparent programming environment with its Project Manager, Project Editor and Fonts Editor features optimum device configurations for Lenze controllers, making project planning and subsequent operation easy.

* See Software section – PC software, page 2-20

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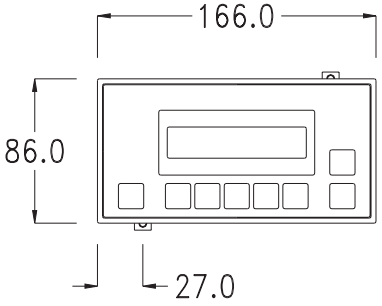
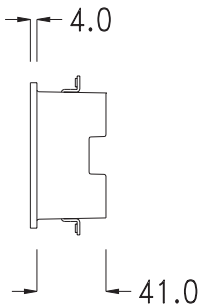
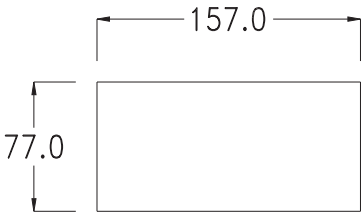
Display	H310
Type	Text, backlit LED LC display
Display size [mm]	73.5 x 11.5
Lines x characters	2 x 20
Text character matrix (pixels)	5 x 7
Character size [mm]	3.2 x 5.5
User memory	
Application program	48 kB
Interfaces	
Serial port ASP8	RS232
Clock	
Real-time clock with date	–
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	166 x 86 x 45
Mounting cutout (W x H) [mm]	157 x 77
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	5 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	0.5
Conformity	CE, cULus
Product features	
Online languages	4
Password	–
Bit password	8 bits
Pages/Help	127
Variables per page	12
Variable format	DEC, HEX, BIN, BCD, floating point
Dynamic texts	●
Alarms	–
Info messages	128
Alarm buffer	–
Recipes	–
System and function keys	8 / 5





Mounting cutout:



Type	Order no.
H310	**EPM-H310**

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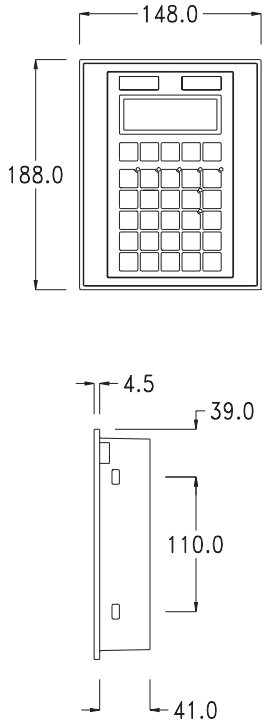
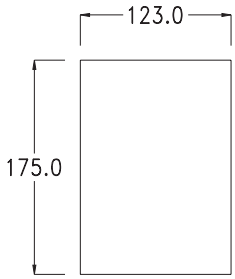
Display	H315
Type	Text, backlit LED LC display
Display size [mm]	70.4 x 20.8
Lines x characters	4 x 20
Text character matrix (pixels)	5 x 7
Character size [mm]	2.95 x 4.75
User memory	
Application program	256 kB
Interfaces	
Serial port ASP8	RS232
Clock	
Real-time clock with date	–
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	148 x 188 x 45.5
Mounting cutout (W x H) [mm]	123 x 175
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	15 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	0.7
Conformity	CE, cULus
Product features	
Online languages	6
Password	10 levels
Bit password	8 bits
Pages/Help	1024/1024
Variables per page	32
Variable format	DEC, HEX, BIN, BCD, floating point
Dynamic texts	●
Alarms	–
Info messages	1024
Alarm buffer	–
Recipes	–
System and function keys	20/5



Mounting cutout:



Type	Order no.
H315	**EPM-H315**

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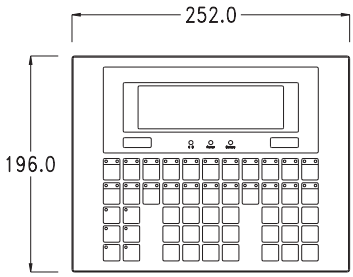
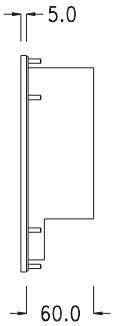
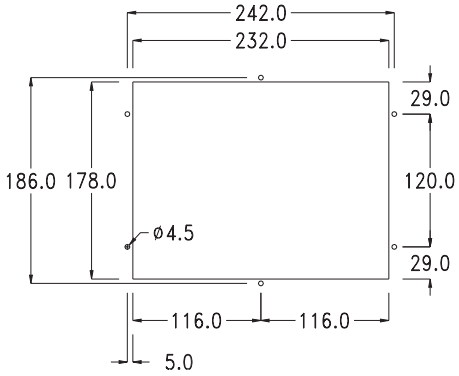
Display	H410
Type	Graphics, backlit LED LC display
Display size [mm]	132 x 39
Resolution	240 x 64
Lines x characters	2 x 10/4 x 20/8 x 40
Text character matrix (pixels)	6 x 8/12 x 16/24 x 32
Character size [mm]	3.2 x 4.2/6.5 x 8.5/12.7 x 17
User memory	
Application program	512 kB
Interfaces	
Serial port MSP	RS232
Clock	
Real-time clock with date	Yes (with back-up battery)
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	252 x 196 x 65
Mounting cutout (W x H) [mm]	232 x 178
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	11 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	1.5
Conformity	CE, cULus
Product features	
Online languages	8
Password	10 levels
Bit password	8 bits
Pages/Help	1024/1024
Variables per page	80
Variable format	DEC, HEX, BIN, BCD, floating point
Bitmaps	Import option during configuration
Graphics symbols	Static/dynamic
Dynamic texts	●
Alarms	1024
Info messages	1024
Alarm buffer	256
Recipes	128 kB
Trend display	Line or point
System and function keys	25

Type	Order no.
H410	**EPM-H410**





Mounting cutout:



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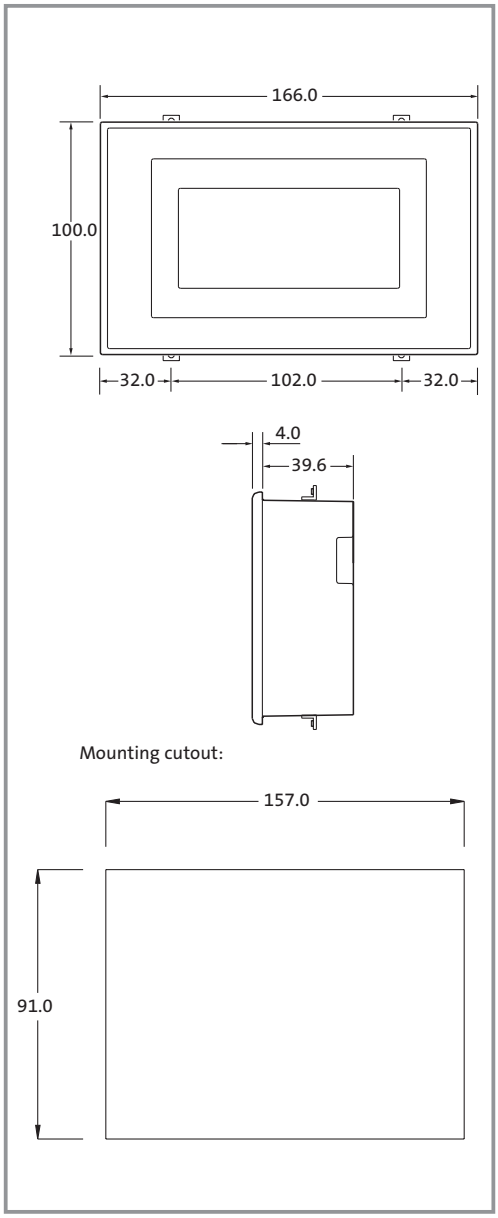
Display	H502
Type	LCD 4 grey scale STN 4"
Display size [mm]	94.5 x 54.5 mm
Touch screen	matrix 20 x 8 (12 x 16 pixels each)
Resolution (pixels)	240 x 128 pixels
Lines x characters	4 x 10/8 x 20/16 x 40
Text character matrix (pixels)	6 x 8/12 x 16/24 x 32
Character size [mm]	2.3 x 5.2/4.6 x 5.8/9.1 x 11.7
User memory	
Application program	640 kB
Interfaces	
Serial port MSP	RS232
Clock	
Real-time clock with date	●
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	166 x 100 x 43.6
Mounting cutout (W x H) [mm]	157 x 91
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	10 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	0.5
Conformity	CE, cULus
Product features	
Online languages	4
Password	10
Bit password	8 bits
Pages/Help	64/64
Variables per page	32
Variable format	DEC, HEX, BIN, BCD, floating point
Bitmaps	Import option during configuration
Keys per page	24
Graphics symbols	Static/dynamic
Dynamic texts	●
Alarms	256
Info messages	256
Alarm buffer	256
Recipes	16 kB
Trend display	–



Type	Order no.
H502	EPM-H502

4

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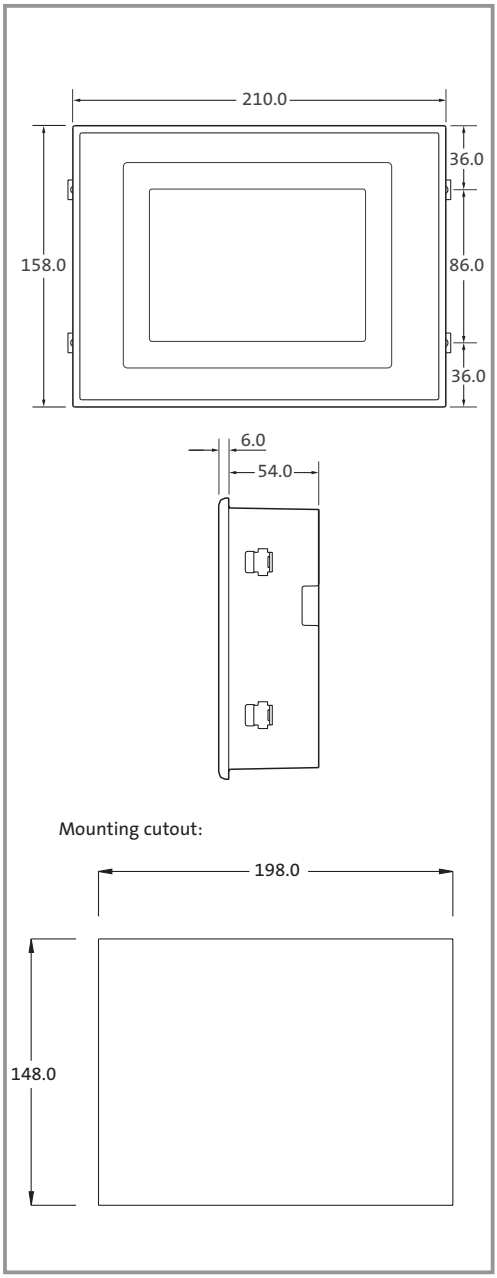
Display	H505
Type	LCD 4 blue STN 5.6"
Display size [mm]	115.2 x 86.4
Touch screen	matrix 20 x 16 (16 x 15 pixels each)
Resolution (pixels)	320 x 240
Lines x characters	4 x 10/8 x 20/16 x 40
Text character matrix (pixels)	8 x 15 x 16 x 60
Character size [mm]	2.8 x 5.2 x 5.6 x 20.8
Background lighting	
Service life at 25°C	45,000 hours
User memory	
Application program	640 kB
Interfaces	
Serial port MSP	RS232
Clock	
Real-time clock with date	–
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	210 x 158 x 60
Mounting cutout (W x H) [mm]	198 x 148
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	1.4
Conformity	CE, cULus
Product features	
Online languages	4
Password	10
Bit password	8 bits
Pages/Help	64/64
Variables per page	34
Variable format	DEC, HEX, BIN, BCD, floating point
Bitmaps	Import option during configuration
Keys per page	24
Graphics symbols	Static/dynamic
Dynamic texts	●
Alarms	–
Info messages	256
Alarm buffer	–
Recipes	16 kB
Trend display	–



Type	Order no.
H505	EPM-H505

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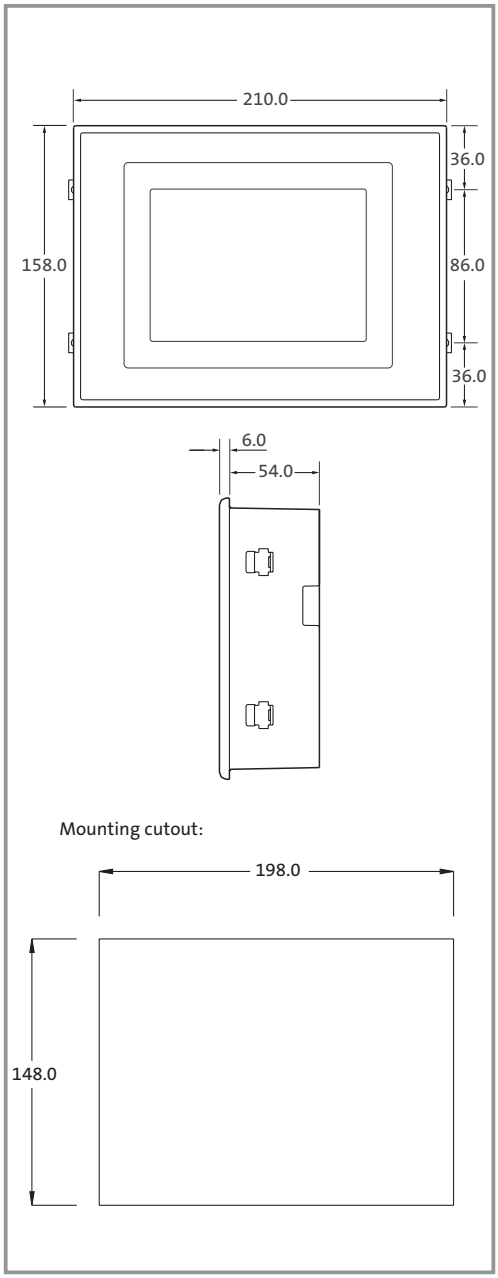
Display	H510
Type	LCD monochrome STN 5.5"
Display size [mm]	123 x 68
Touch screen	matrix 20 x 8 (12 x 16 pixels each)
Resolution (pixels)	240 x 128
Lines x characters	4 x 10/8 x 20/16 x 40
Text character matrix (pixels)	6 x 8/12 x 16/24 x 32
Character size [mm]	3 x 4/6 x 8/12 x 16
Background lighting	
Service life at 25°C	15,000 hours
User memory	
Application program	512 kB
Interfaces	
Serial port MSP	RS232
Clock	
Real-time clock with date	Yes (with back-up battery)
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	210 x 158 x 60
Mounting cutout (W x H) [mm]	198 x 148
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	15 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	1.3
Conformity	CE, cULus
Product features	
Online languages	8
Password	10 levels
Bit password	8 bits
Pages/Help	1024/1024
Variables per page	96
Variable format	DEC, HEX, BIN, BCD, floating point
Bitmaps	Import option during configuration
Keys per page	160
Graphics symbols	Static/dynamic
Dynamic texts	●
Alarms	1024
Info messages	1024
Alarm buffer	256
Recipes	128 kB
Trend display	Line or point



Type	Order no.
H510	EPM-H510

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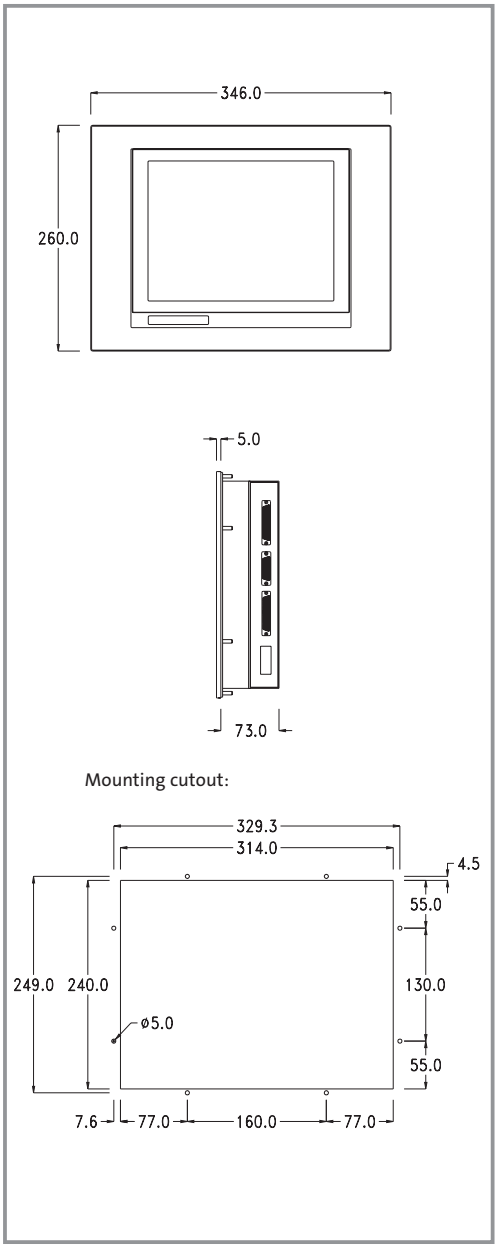
Display	H520
Type	LCD 256 colours TFT 10.4"
Display size [mm]	211.2 x 158.4
Touch screen	matrix 40 x 30 (16 x 16 pixels each)
Resolution (pixels)	640 x 480
Lines x characters	7 x 20/15 x 40/30 x 80
Text character matrix (pixels)	8 x 16/16 x 32/32 x 64
Character size [mm]	2.7 x 5.4/5.4 x 10.7/10.7 x 21.4
Background lighting	
Service life at 25°C	30,000 hours
User memory	
Application program	2 MB
Interfaces	
Serial port MSP	RS232
Parallel port LPT	Centronics
Clock	
Real-time clock with date	Yes (with back-up battery)
Networks	
Fieldbus	CAN system bus
Dimensions	
External (W x H x D) [mm]	346 x 260 x 79
Mounting cutout (W x H) [mm]	314 x 240
Technical data	
Voltage supply	24 V DC (18 ... 32 V DC)
Power consumption 24 V DC	15 W
Enclosure	IP65 front panel
Operating temperature	0 ... +50°C
Storage/transportation temperature	-20 ... +60°C
Humidity (no moisture condensation)	<85%
Weight [kg]	4.0
Conformity	CE, cULus
Product features	
Online languages	8
Password	10 levels
Bit password	8 bits
Pages/Help	1024/1024
Variables per page	128
Variable format	DEC, HEX, BIN, BCD, floating point
Bitmaps	Import option during configuration
Keys per page	304
Graphics symbols	Static/dynamic
Dynamic texts	●
Alarms	1024
Info messages	1024
Alarm buffer	256
Recipes	256 kB
Trend display	Line or point

* Graphics only



Type	Order no.
H520	EPM-H520

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Protective foils

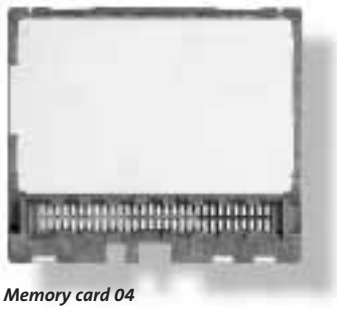
Use the protective foils listed below to increase the chemical resistance of the user interface:

- Protective foil 4
  suitable for the EPM-H502 device
- Protective foil 6
  suitable for EPM-H505/H510 devices
- Protective foil 10
  suitable for the EPM-H520 device

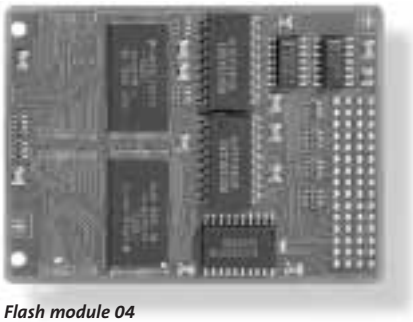
Memory cards

You can use memory cards to expand the graphics/project memories of your devices:

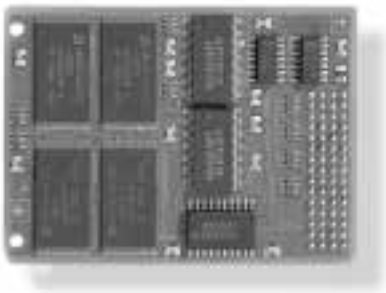
- Memory card 04
  4 MB project memory card for the H410 device
- Flash module 04
  4 MB graphics expansion memory card for the H520 device
- Flash module 08
  8 MB project memory card for the H520 device



Memory card 04



Flash module 04



Flash module 08

Type	Order no.
Protective foil 4	EPZ-H704
Protective foil 6	EPZ-H706
Protective foil 10	EPZ-H710

Type	Order no.
Memory card 04	EPZ-H210
Flash module 04	EPZ-H220
Flash module 08	EPZ-H221

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System cable for HMI Designer

So that HMI Designer can be used in multiple applications, we offer the following accessories:

Download cable
Access via PC to the MSP interface of the device

*Download cable **

Adapter fitting
Access (together with the download cable) via PC to the ASP8 interface of the device

*Adapter fitting **

Type	Order no.
Download cable	EPZ-H110
Adapter fitting	EPZ-H111

* A download cable and an adapter fitting are included in the scope of supply of HMI Designer.

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IP20 I/O system | 9300 servo inverter

The ideal solution for every application

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The modular system 5-2
Standards and operating conditions 5-3

Compact system

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Modular system

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The ideal solution for every application

The increasing level of automation in machines and systems and the consequent rise in the number of I/O devices have in turn increased the amount of wiring required. Decentralised I/O systems bring order to this chaos. Lenze has developed two product concepts which are suitable for both basic digital applications and more complex automation tasks.

The compact system
The product family comprises a range of compact products with a fixed number of digital inputs and outputs. It has a built-in communication interface in the form of the CAN system bus. The compact system is available in four different versions – one of which is bound to meet your exact application requirements.

8, 16 and 32-channel modules can be supplied in one or three-wire technology with up to 24 inputs and 8 outputs.

The modules have a SUB-D connector for the connection of the system bus, pluggable tension spring terminal strips to speed up the wiring process and a switch for the node address. The compact system offers operational reliability, can be mounted quickly and easily on 35 mm standard mounting rails and is even easy to configure. All in all, this makes for faster commissioning.

The modular system
We can provide a complete range of I/O systems for more complex automation applications. The modular system comprises three components: a gateway, electronic modules and a backplane bus.

The modular system is connected to the CAN system bus via the gateway. An internal backplane bus is used for the intra-station communication of process and parameter data, as well as diagnostic data.

The electronics modules house the actual I/O functions. Up to 32 units can be combined as required to form an overall station where each module is optimised for the individual application in which it is to be used.

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Standards and operating conditions

Area	Values		
Vibration resistance	1G/12G, in acc. with IEC 60068-2-6/60068-2-27		
Climatic conditions	RH1 to EN 61131-2 (no moisture condensation, relative humidity 50 ... 95%)		
Permissible temperature ranges	Transport: Storage: Operation: ▶ Horizontal mounting ▶ Vertical mounting	-25 ... +70°C -45 ... +85°C 0 ... +55°C 0 ... +45°C	
Mounting positions	Horizontal and vertical		
Degree of pollution	Degree of pollution 2 to EN 61131-2		
Noise emission	Compliance with limit class A to EN 55011		
Noise immunity	**requirements** ESD Conducted high frequency RF interference (housing) Burst	**Standard** EN 61000-4-2 EN 61000-4-6 EN61000-4-3 EN61000-4-4	**Severity** 3, i.e. 8 kV for air discharge and 6 kV for contact discharge 150 ... 80 MHz, 10 V/m 80% AM (1 kHz) 80 ... 1000 MHz, 10 V/m 80% AM (1 kHz) 895 ... 905 MHz, 10 V/m 50% ED PM (200 Hz) 3/4, i.e. 1 kV/5 kHz
Insulation resistance	In acc. with IEC 61131-2		
Insulation voltage to reference earth	I/O: 50 V AC/DC, test voltage 500 V AC		
Electrical isolation to system bus (CAN)	Modular system, compact modules		Yes, via optocoupler
Electrical isolation to process level	Modular system		Yes, via optocoupler
Packaging	Transport packaging to DIN 4180		
Enclosure	IP20		
Labelling **Approvals**	CE: Meets the requirements of the EC's Low Voltage Directive cULus: Approved to UL 508, file no. E234291		

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Digital I/O modules

Type	**8 x dig. I/O compact**	**16 x dig. I/O compact**	**32 x dig. I/O compact**
Electrical data			
Number of inputs/outputs	0 ... 8/8 ... 0 (total no. of channels: 8)	8 ... 12/8 ... 4 (total no. of channels: 16)	24/8 (total no. of channels: 32)
Voltage supply	24 V DC (20.4 ... 28.8 V)	24 V DC (20.4 ... 28.8 V)	24 V DC (20.4 ... 28.8 V)
Rated input voltage	24 V DC (18 ... 35 V)	24 V DC (18 ... 35 V)	24 V DC (18 ... 35 V)
Rated load voltage	24 V DC (18 ... 35 V)	24 V DC (18 ... 35 V)	24 V DC (18 ... 35 V)
Signal voltage "0"/"1"	0 ... 5 V/15 ... 30 V DC	0 ... 5 V/15 ... 30 V	DC 0 ... 5 V/15 ... 30 V DC
Output current per channel	1 A	1 A	1 A
Electrical isolation	yes, via optocoupler	yes, via optocoupler	yes, via optocoupler
Programming data			
Input data	1 byte	2 bytes	3 bytes
Output data	1 byte	1 byte	1 byte
Parameter data	–	–	–
Diagnostic data	2 bits	2 bits	2 bits
Dimensions			
Dimensions (W x H x D) [mm]	101 x 76 x 46	101 x 76 x 46 (1-wire) 152 x 76 x 46 (3-wire)	152 x 76 x 46
Order no.	**EPM-T830** (3-wire)	**EPM-T831** (1-wire) **EPM-T833** (3-wire)	**EPM-T832** (1-wire)

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Gateway

Type	CAN gateway
Electrical data	
Voltage supply	24 V DC (20.4 ... 28.8 V)
Connections	9-pin SUB-D
Electrical isolation	yes, via optocoupler
CAN bus interface	
Protocol	CAN system bus/CANopen
Connection	9-pin SUB-D
Transfer rate	10 kBps to 1 MBps
Number of stations	Max. 63
Dimensions	
Dimensions (W x H x D) [mm]	25.4 x 76 x 76
Order no.	**EPM-T110**

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Digital I/O modules

Type	8 x digital input	16 x digital input	8 x digital output 1A	8 x digital output 2A	16 x digital output 1A
Electrical data					
Number of Inputs / outputs	8 / –	16 / –	– / 8	– / 8	– / 16
Rated input voltage	DC 24 V (18 ... 28.8 V)	DC 24 V (18 ... 28.8 V)	–	–	–
Rated load voltage	–	–	DC 24 V (18 ... 35 V)	DC 24 V (18 ... 35 V)	DC 24 V (18 ... 35 V)
Signal voltage „0“ / „1“	DC 0 ... 5 V / 15 ... 30 V	DC 0 ... 5 V / 15 ... 30 V	–	–	–
Output voltage per channel	–	–	1 A	2 A max. residual current 10 A	1 A max. residual current 10 A
Electric isolation	yes, via optocoupler	yes, via optocoupler	yes, via optocoupler	yes, via optocoupler	yes, via optocoupler
Programming data					
Input data	1 Byte	2 Byte	–	–	–
Output data	–	–	1 Byte	1 Byte	2 Byte
Parameter data	–	–	–	–	–
Diagnostic data	–	–	–	–	–
Dimensions					
Dimensions (B x H x T) [mm]	25.4 x 76 x 76	25.4 x 76 x 76	25.4 x 76 x 76	25.4 x 76 x 76	25.4 x 76 x 76
Order no.	**EPM-T210**	**EPM-T211**	**EPM-T220**	**EPM-T221**	**EPM-T223**

Type	4 x relay	8 x digital in-/output
Electrical data		
Number of Inputs / outputs	– / 4 via relay	0 ... 8 / 8 ... 0 (total no. of channels: 8)
Rated input voltage	–	DC 24 V (18 ... 35 V)
Rated load voltage	AC 230 V or max. DC 30 V	DC 24 V (18 ... 35 V)
Signal voltage „0“ / „1“	–	DC 0 ... 5 V / 15 ... 30 V
Output voltage per channel	AC 230 V: 5 A max. residual current 10 A	1 A DC 30 V: 5 A
Electric isolation	yes, via optocoupler	yes, via optocoupler
Programming data		
Input data	–	1 Byte
Output data	1 Byte	1 Byte
Parameter data	–	–
Diagnostic data	–	–
Dimensions		
Dimensions (B x H x T) [mm]	25.4 x 76 x 76	25.4 x 76 x 76
Order no.	**EPM-T222**	**EPM-T230**

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Analog I/O modules

Type	4 x Analog Eingang	4 x Analog Ausgang	4 x Analog Ein-/Ausgang
Electrical data			
Number of Inputs / outputs	4 or 2 (4-wire)/–	– / 4	2 / 2
Input area output area:			
Voltage	DC ± 10 V, ± 4 V, ± 400 mV, 0 ... 50 mV	DC ± 10 V, 0 ... 10 V, 1 ... 5 V	DC ± 10 V, 0 ... 10 V, 1 ... 5 V
Current	0 / 4 ... 20 mA, +-20 mA	0 / 4 ... 20 mA, ± 20 mA	0 / 4 ... 20 mA, ± 20 mA
Temperature	PT100, PT1000, NI100, NI1000	–	–
Thermocouple	J, K, N, R, S, T	–	–
Resolution	16 Bit	12 Bit	Output 12 Bit, Input 16 Bit
Electric isolation	yes, via optocoupler	yes, via optocoupler	yes, via optocoupler
Programming data			
Input data	8 Byte	–	4 Byte
Output data	–	8 Byte	4 Byte
Parameter data	10 Byte	6 Byte	8 Byte
Diagnostic data	4 Byte	4 Byte	4 Byte
Dimensions			
Dimensions (B x H x T) [mm]	25.4 x 76 x 76	25.4 x 76 x 76	25.4 x 76 x 76
Order no.	**EPM-T310**	**EPM-T320**	**EPM-T330**

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Function modules

Type	2 / 4xcounter
Electrical data	
Number of counters	2/4 (32/16-bit counter width)
Operating modes	Up/downcounter Compare/Auto Reload function Encoder pulses Continuous period measurement Frequency measurement
Counter frequency	1 MHz
Signal voltage "0"/"1"	-5 ... 7 V/13 ... 36 V DC
Electrical isolation	yes, via optocoupler
Programming data	
Input data	10 bytes
Output data	9 bytes
Parameter data	2 bytes
Diagnostic data	–
Dimensions	
Dimensions (W x H x D) [mm]	25.4 x 76 x 76
Order no.	**EPM-T410**

Type	SSI-Interface
Electrical data	
Number of channels	1
Inputs / outputs	
Anzahl	2, wahlweise parametrierbar
Signal voltage „0“ / „1“	DC -5 ... 7 V / 13 ... 36 V
Programming data	
Input data	8 Byte
Output data	8 Byte
Parameter data	2 Byte
Diagnostic data	–
Dimensions	
Dimensions (B x H x T) [mm]	25.4 x 76 x 76
Order no.	**EPM-T411**

Type	1xZähler / 16xDigital Eingang
Electrical data	
Number of Inputs / outputs	16 / –
Operating modes	Up/downcounter Encoder pulses Continuous period measurement Frequency measurement
Number of counters	100 kHz
Rated input voltage	DC 24 V / 18 ... 28.8 V
Signal voltage „0“ / „1“	DC 0 ... 5 V / 15 ... 30 V
Programming data	
Input data	8 Byte
Output data	8 Byte
Parameter data	1 Byte
Diagnostic data	–
Dimensions	
Dimensions (B x H x T) [mm]	25.4 x 76 x 76
Order no.	**EPM-T430**

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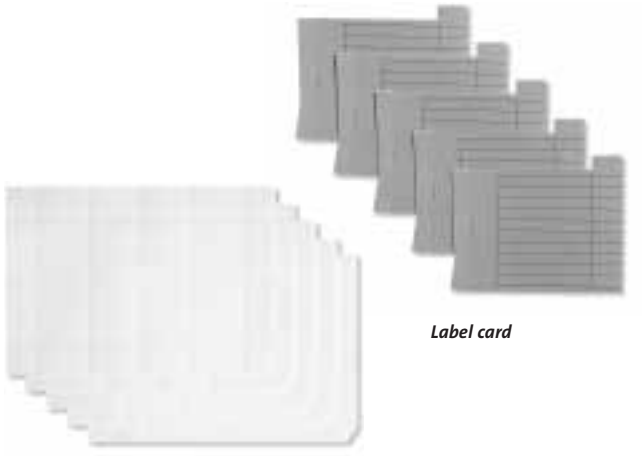
Backplane bus

The backplane bus is used to connect the individual components of the modular system to an overall station. To maximise system flexibility, we offer four different versions of the bus.

The single-slot backplane bus is used to connect two modules, the 4-slot backplane bus to connect five modules, etc. Combinations maximise flexibility.

Label sheet/card [1)]

There are two ways of labelling the system modules. The label sheet is DIN A4 format and can therefore be printed using standard printers. The label card is used for local labelling.



Label card

Label sheet

Terminal strip [1)]

The terminal strip is used to connect the field wiring to the appropriate I/O modules. The terminals are fitted with tension spring technology.

Terminal module

Take advantage of the possibility of using terminal modules to support the requirements of 2/3-wire connections even in a modular system.

CAN bus connector node/termination

The connectors are used to connect the CAN to the compact system/gateway. They are screw type connectors. Two versions are available, one with and one without CAN terminating resistor (for CAN bus node/termination).

Type	Order no.
Backplane bus, 1 slot	**EPM-T910**
2 slots	**EPM-T911**
4 slots	**EPM-T912**
8 slots	**EPM-T913**
Terminal strip	**EPM-T920**
Label card	**EPM-T930**
Label sheet	**EPM-T931**
Terminal module	**EPM-T940**
CAN bus connector node	**EPM-T950**
CAN bus connector termination	**EPM-T951**
System Manual (de/en/fr)	**EDSPM-TXXX** [2)]

[1)] Included in the scope of supply of the modules

[2)] Please specify the required language when ordering documentation

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Accessories | 9300 servo inverter

Controller

Mains cable protection 6-2
Mains filter A 6-4
Mains filter B 6-8
System cables 6-12
Keypad XT operating module 6-14

DC-bus operation

DC fuses 6-16
Brake module/brake chopper 6-20
Regenerative power supply module 9340 6-24
9360 DC power supply units 6-28

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Mains cable protection

Circuit breakers or fuses can be used for cable protection.

Depending on the mains current supply of each controller (operation with mains filter), the following protection devices are required.

Assignment

Device	Rated current Protection device	Fuse		Circuit breaker	Cable cross-section	
		VDE	UL	VDE	mm²	AWG
9321	6 A	M 6 A	5 A	B 6 A	1	17
9322	6 A	M 6 A	5 A	B 6 A	1	17
9323	10 A	M 10 A	10 A	B 10 A	1.5	15
9324	10 A	M 10 A	10 A	B 10 A	1.5	15
9325	20 A	M 20 A	20 A	B 20 A	4	11
9326	32 A	M 32 A	25 A	B 32 A	6	9
9327	63 A	M 35 A	35 A	–	10	7
9328	63 A	M 50 A	50 A	–	16	5
9329	80 A	M 80 A	80 A	–	25	3
9330	100 A	M 100 A	100 A	–	50	0
9331	125 A	M 125 A	125 A	–	70	2/0
9332	160 A	M 160 A	175 A	–	95	3/0

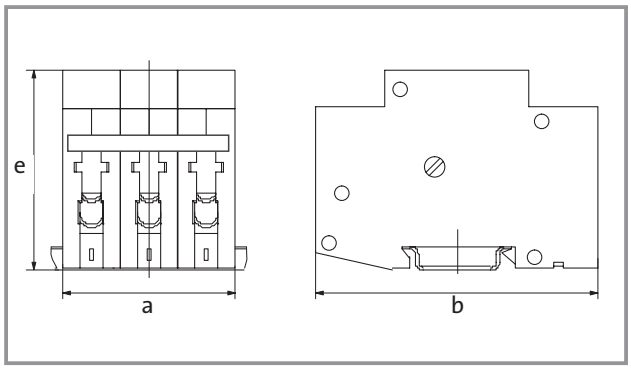
Automatic circuit breakers

Servo-inverter-specific circuit breakers and cable protection fuses with fuse holders are available up to a mains current of 32 A.

Device	Circuit breaker		
	Rated current	Order no.	Required number
9321	B 6 A	**EFA3B06A**	1
9322	B 6 A	**EFA3B06A**	1
9323	B 10 A	**EFA3B10A**	1
9324	B 10 A	**EFA3B10A**	1
9325	B 20 A	**EFA3B20A**	1
9326	B 32 A	**EFA3B32A**	1

Dimensions

Circuit breakers



Type	a [mm]	b [mm]	e [mm]
EFA3B□□□A	53	90	63

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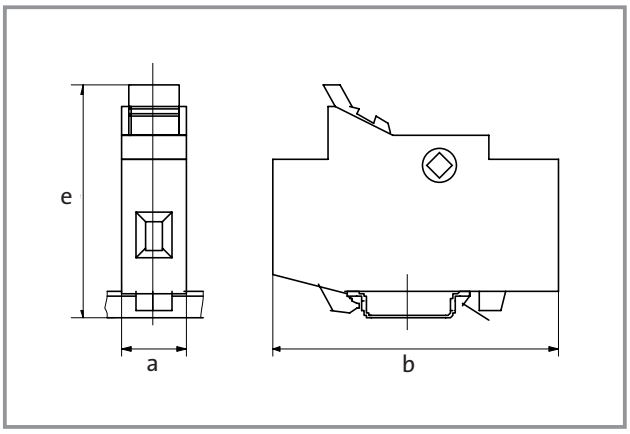
Cable protection fuses

Device	Fuse			Fuse holder		
	Rated current	Size	Order no.	Required number	Order no.	Required number
9321	M 6 A	10 x 38	**EFSM-0060AWE**	3	**EFH10001**	3
9322	M 6 A	10 x 38	**EFSM-0060AWE**	3	**EFH10001**	3
9323	M 10 A	10 x 38	**EFSM-0100AWE**	3	**EFH10001**	3
9324	M 10 A	10 x 38	**EFSM-0100AWE**	3	**EFH10001**	3
9325	M 20 A	10 x 38	**EFSM-0200AWE**	3	**EFH10001**	3
9326	M 32 A	14 x 51	**EFSM-0320AWH**	3	**EFH10002**	3

We recommend standard fuses for 9327 to 9332 devices.

Dimensions

Fuse holder



Type	a [mm]	b [mm]	e [mm]	Fuse dimensions
EFH10001	17.5	81	68	10 x 38
EFH10002	26	81	68	14 x 51

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Mains filter A

Depending on the application, various measures can be taken on the supply side for mains current reduction and interference suppression on servo inverters.

Although these measures are usually not absolutely necessary, they do ensure that your servo inverter is suitable for universal use.

Mains filters reduce electromagnetic interference and the mains currents of the controller. There are two limit classes for electromagnetic interference.

Limit class A is often required for industrial mains supplies operating separately from mains supplies in residential areas.

Limit class B is valid for residential areas. The noise emitted by the connected consumers must not exceed the defined characteristic.

In order to meet the requirements of limit class A, you can connect a mains filter A upstream of the servo inverter.

Assignment and technical data

Device	Mains filter A				
	Order no.	I_r [A]	U_{mains} [V]	Inductance [mH]	Weight [kg]
9321	EZN3A2400H002	1.5	480	24.0	0.80
9322	EZN3A1500H003	2.5	480	15.0	1.15
9323	EZN3A0900H004	4.0	480	9.00	1.55
9324	EZN3A0500H007	7.0	480	5.00	2.55
9325	EZN3A0300H013	13.0	480	3.00	5.20
9326	EZN3A0150H024	24.0	480	1.50	8.20
9327	E82ZN22334B230	42.0	500	0.70	13.0
9328	E82ZN22334B230	42.0	500	0.70	13.0
9329	E82ZN30334B230	55.0	500	0.55	19.0
9330	E82ZN55334B230	100.0	500	0.30	29.0
9331	E82ZN75334B230	135.0	500	0.15	53.0
9332	E82ZN75334B230	135.0	500	0.15	53.0

The RFI filters meet UL/cUL requirements.

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Dimensions of mains filter A, for connection to the servo inverter (9321 to 9326)

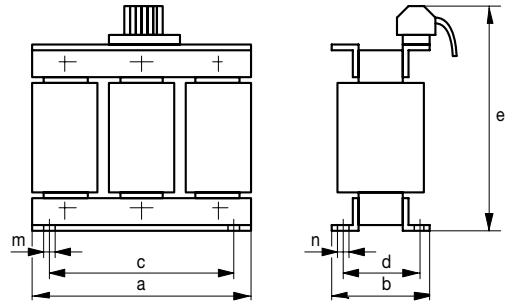

Figure A

Order no.	Dimensions [mm]							
	Figure	a	b	c	d	e	m	n
EZN3A2400H002	A	77	52	50	38	92	5	9
EZN3A1500H003	A	95	82	56	35	115	5	9
EZN3A0900H004	A	95	90	56	43	116	5	9
EZN3A0500H007	A	119	95	90	49	138	5	9
EZN3A0300H013	A	150	106	113	64	162	6	11
EZN3A0150H024	A	180	120	136	67	192	7	12

Dimensions of mains filter A, for mounting under the servo inverter (9327 to 9332)

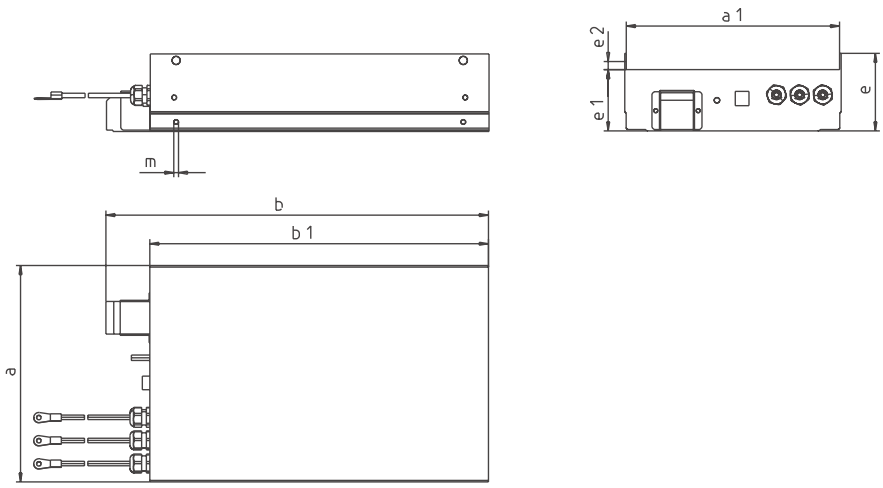

Figure B

Order no.	Figure	Dimensions [mm]							
		a	a1	b	b1	e	e1	e2	m
E82ZN22334B230	B	235.5	231	410	350	110	90	11.5	5
E82ZN30334B230				430					
E82ZN55334B230	B	318	313.5	685	590	114	90	14.5	8
E82ZN75334B230		428	423.5	760	670				

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Mains filter A

Mains filter A, alternative for mounting above the servo inverter

Assignment and technical data

Device	Mains filter A					
	Order no.	I_r [A]	U_{mains} [V]	Inductance [mH]	Weight [kg]	
9327	EZN3A0110H030	30.0	480	1.1	16.0	
9328	EZN3A0080H042	42.0	480	0.80	17.0	
9329	EZN3A0055H060	60.0	480	0.55	30.0	
9330	EZN3A0037H090	90.0	480	0.37	40.0	
9331	EZN3A0022H150	150.0	480	0.22	60.0	
9332	EZN3A0022H150	150.0	480	0.22	60.0	

Dimensions of mains filter A, for mounting above the servo inverter (9327 to 9330)

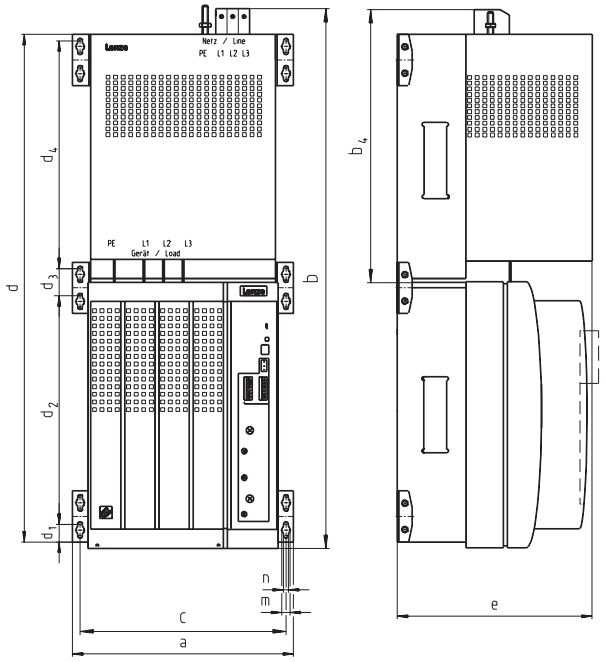

Figure C

Order no.	Figure	Dimensions [mm]											
		a	b	b_1	c	d	d_1	d_2	d_3	d_4	e	m	n
EZN3A0110H030	C	278	710	365	258	670	22	300	38	300	250	11	6.5
EZN3A0080H042													
EZN3A0055H060											285		
EZN3A0037H090	C	368	1015	516	345	964	38	543	38	335	285	18	11

The filter has an adapted connecting cable and must therefore be connected directly to the servo inverter.

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Dimensions of mains filter A, suitable for mounting next to or below the servo inverter (9331, 9332)

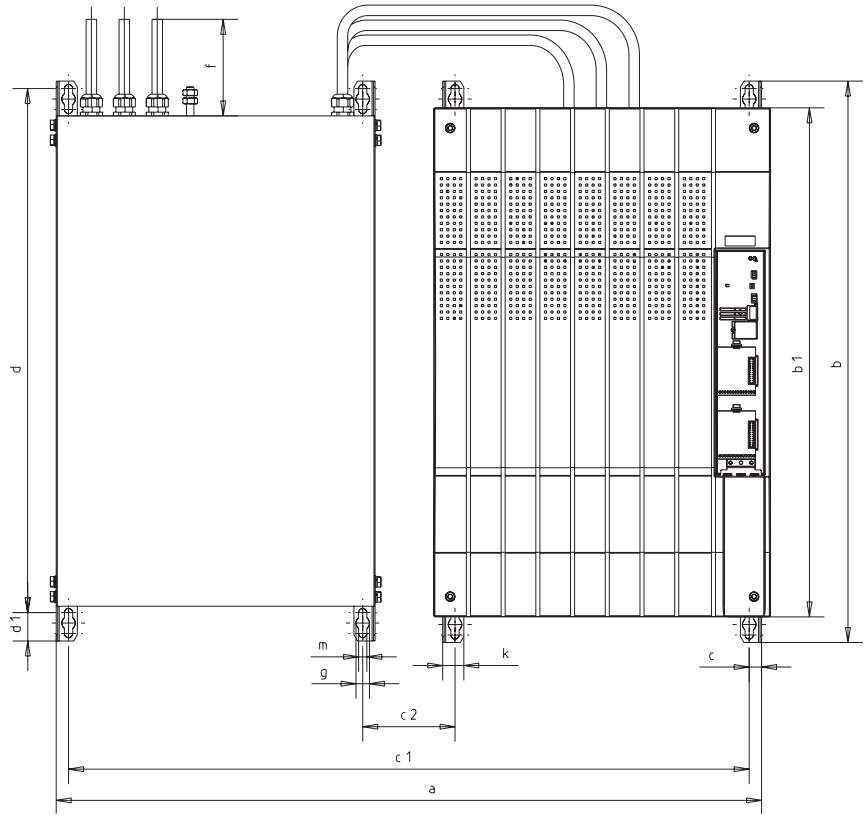

Figure D

Order no.	Figure	Dimensions [mm]													
		a	b	b1	c	c1	c2	d	d1	e	e1	f	g	k	m
EZN3A0022H150	D	1000	750	680	16	970	180	702	38	285	207,5	1000	18	28	11

The mains filter has an adapted connecting cable.

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Mains filter B

Depending on the application, various measures can be taken on the supply side for mains current reduction and interference suppression on servo inverters.

Although these measures are usually not absolutely necessary, they do ensure that your servo inverter is suitable for universal use.

Mains filters reduce electromagnetic interference and the mains currents of the controller. There are two limit classes for electromagnetic interference.

If the servo inverter is not being operated on an industrial mains supply but in a residential area, the drive may cause interference on other devices such as radio and television receivers. In this case you must provide a means of radio interference suppression to EN 55011, limit class B.

Limit class B is considerably more stringent than limit class A. Limit class A is valid for industrial mains supplies. In order to ensure adherence to limit class B, you can connect a mains filter B upstream of the servo inverter.

Assignment and technical data

Device	Mains filter B				
	Order no.	I_r [A]	U_{mains} [V]	Inductance [mH]	Weight [kg]
9321	**EZN3B2400H002**	1.5	480	24.0	0.8
9322	**EZN3B1500H003**	2.5	480	15.0	1.15
9323	**EZN3B0900H004**	4.0	480	9.0	1.55
9324	**EZN3B0500H007**	7.0	480	5.0	2.55
9325	**EZN3B0300H013**	13.0	480	3.0	5.2
9326	**EZN3B0150H024**	24.0	480	1.5	8.2
9327	**E82ZN22334B230** [1)]	42.0	500	0.7	13.0
9328	**E82ZN22334B230** [1)]	42.0	500	0.7	13.0
9329	**E82ZN30334B230** [1)]	55.0	500	0.55	19.0
9330	**E82ZN55334B230** [1)]	100.0	500	0.3	29.0
9331	**E82ZN75334B230** [1)]	135.0	500	0.15	53.0
9332	**E82ZN75334B230** [1)]	135.0	500	0.15	53.0

[1)] A low-capacitance motor cable (max. length 10 m) must be used in order to ensure adherence to limit class B

The RFI filters meet UL/cUL requirements.

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Dimensions of mains filter B, for connection to the servo inverter (9321 to 9326)

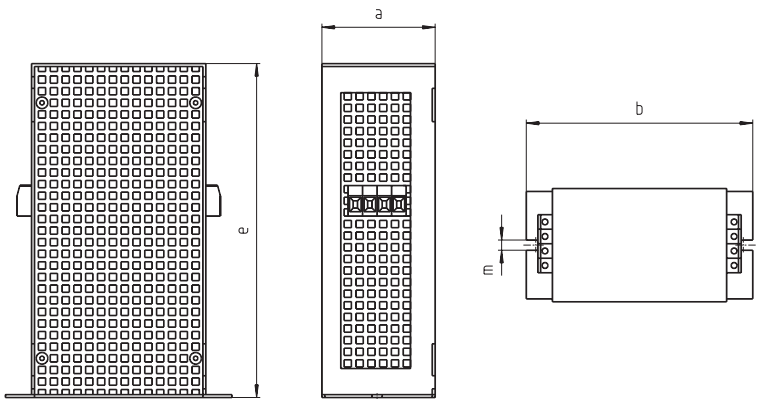
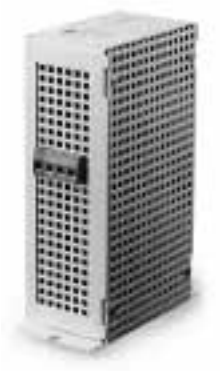


Figure A



Order no.	Figure	Dimensions [mm]			
		a	b	e	m
EZN3B2400H002	A	78	150	230	7
EZN3B1500H003	A	78	150	230	7
EZN3B0900H004	A	97	180	230	7
EZN3B0500H007	A	97	180	230	7
EZN3B0300H013	A	135	260	230	7
EZN3B0150H024	A	135	260	230	7

Dimensions of mains filter B, for mounting under the servo inverter (9327 to 9332)

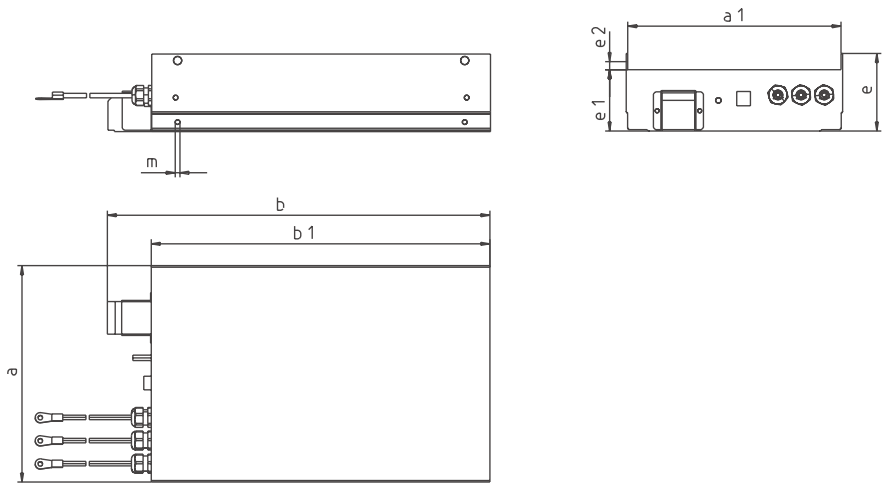


Figure B

Order no.	Figure	Dimensions [mm]							
		a	a1	b	b1	e	e1	e2	m
E82ZN22334B230	B	235.5	231	410	350	110	90	11.5	5
E82ZN30334B230				430					
E82ZN55334B230	B	318	313.5	685	590	114	90	14.5	8
E82ZN75334B230		428	423.5	760	670				

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Mains filter B

Mains filter B, alternative for mounting above the servo inverter

Assignment and technical data

Device	Mains filter A				
	Order no.	I_r [A]	U_{mains} [V]	Inductance [mH]	Weight [kg]
9327	EZN3B0110H030	30.0	480	1.1	16.0
9328	EZN3B0080H042	42.0	480	0.80	17.0
9329	EZN3B0055H060	60.0	480	0.55	30.0
9330	EZN3B0037H090	90.0	480	0.37	40.0
9331	EZN3B0022H150	150.0	480	0.22	60.0
9332	EZN3B0022H150	150.0	480	0.22	60.0

Dimensions of mains filter B, alternative for mounting above the servo inverter (9327 to 9330)

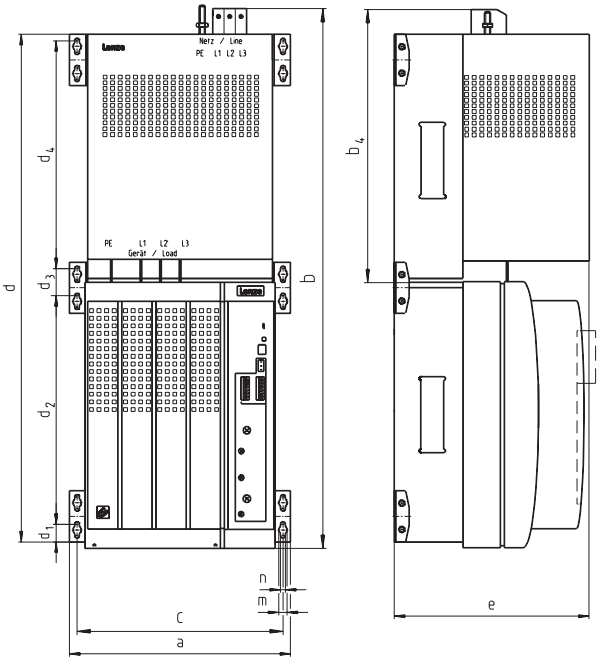

Figure C

Order no.	Figure	Dimensions [mm]											
		a	b	b_1	c	d	d_1	d_2	d_3	d_4	e	m	n
EZN3B0110H030	C	278	710	365	258	670	22	300	38	300	250	11	6.5
EZN3B0080H042													
EZN3B0055H060											285		
EZN3B0037H090	C	368	1015	516	345	964	38	543	38	335	285	18	11

The filter has an adapted connecting cable and must therefore be connected directly to the servo inverter.

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Dimensions of mains filter B, suitable for mounting next to or below the servo inverter (9331, 9332)

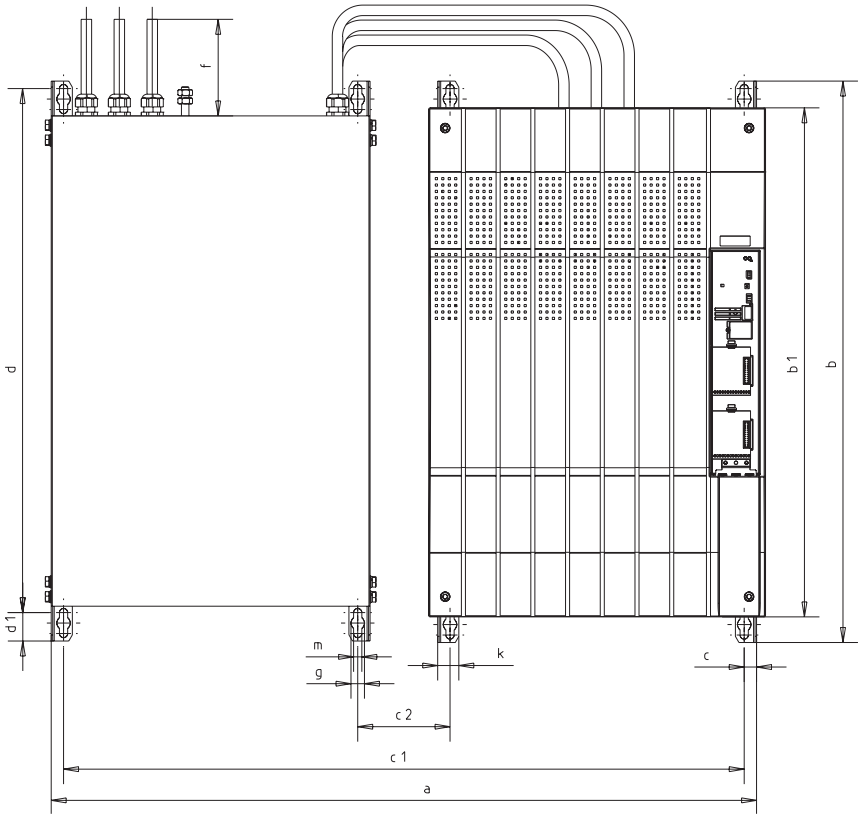

Figure D

Order no.	Figure	Dimensions [mm]													
		a	b	b1	c	c1	c2	d	d1	e	e1	f	g	k	m
EZN3B0022H150	D	1000	750	680	16	970	180	702	38	285	207,5	1000	18	28	11

The mains filter has an adapted connecting cable.

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System cables

Master frequency networking
For speed or angular synchronism on a number of drives, you can network the controllers via the master frequency. The outputs and inputs required for this purpose, which are available as standard, are simply connected via the system cables supplied.

Type	Order no.	Length [m]	Diameter [mm]	Bend radius [mm]	Weight[kg]
System cable for master frequency linking	EWLD001GGBS93	1.2	9.3	≥70	0.2
	EWLD002GGBS93	2.5	9.3	≥70	0.4
	EWLD010GGBS93	10	9.3	≥70	1.1
	EWLD025GGBS93	25	9.3	≥70	2.75

A passive master frequency distributor is available for the parallel distribution of the master frequency.

Type	Order no.
Master frequency distributor	EWZ0011

Motor connection
Standard system cables provide an easy and reliable means of connecting Lenze servo motors to controllers.
A range of
- ▶ motor cables
- ▶ cables for feedback systems and
- ▶ fan cables

are available in a variety of cross-sections and lengths up to 100 m. Versions suitable for trailing are also available (see the overview on the next page).

The servo motor catalogs contain detailed descriptions along with order numbers.

Interference filter for SinCos encoder
If the connection between the motor cable shield and PE is not large enough, this may cause interference on the encoder lines. We recommend the use of an interference filter on SinCos encoders in particular if you are using long motor cables and the earthing conditions are not ideal.
The filter is then simply mounted on the encoder input of the controller (design: Gender Changer 9-pin Sub-D socket/plug).

Type	Order no.
Interference filter for SinCos encoder	EZZ0014

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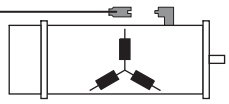
Overview of motor connecting cables

Motor cable

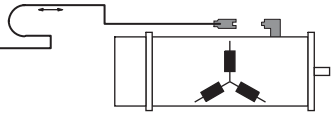
Standard cable

1.5 mm² EWLM□□□GM-015
2.5 mm² EWLM□□□GM-025
4.0 mm² EWLM□□□GM-040I
10.0 mm² EWLM□□□GM-100I



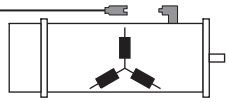
Cable suitable for trailing

2.5 mm² EWLM□□□GMS025



Intermediate cable

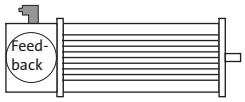
1.5 mm² EWLM□□□GZ-015 EWLM□□□ZM-015



Resolver and encoder cable

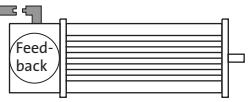
Standard cable

93□□
X7
X8
EWLR□□□GM-T oder
EWLE□□□GM-T



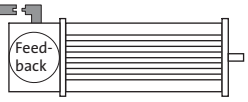
Intermediate cable

EWLR□□□GM-T EWLR□□□ZM-T
oder EWLR□□□GM



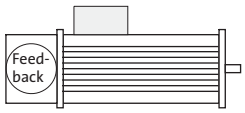
Intermediate cable suitable for trailing

EWLR□□□GM-T EWLR□□□ZMST
oder EWLR□□□GM



Standard cable for terminal box connection
Controller-side connector

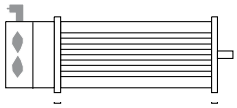
93□□
X7
X8
EWLR□□□GX oder
EWLE□□□GX



Fan cable

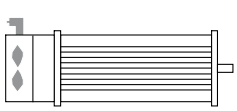
Standard cable

EWLL□□□GM



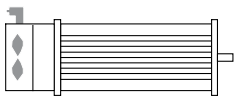
Cable suitable for trailing

EWLL□□□GMS



Intermediate cable

EWLL□□□GM or
EWLL□□□GMS EWLL□□□ZM



□ Cable length [m]

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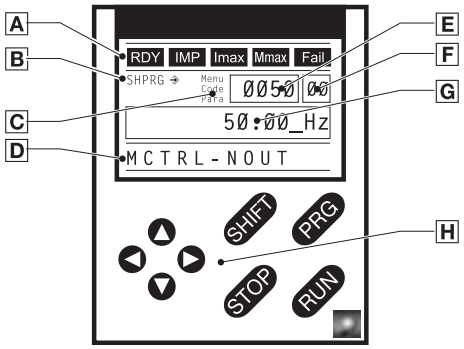
Keypad XT operating module

You can use the keypad XT on all Lenze drives for quick access to device parameters (in order to make corrections where necessary). It plugs into the automation interface (AIF) and is also used for status display and error diagnostics.

For improved user-friendliness, the keypad XT is also available as a handheld device. You will also need a connecting cable for the connection to the controller.

Features

- Reading/writing the codes
- Displaying short text for codes
- Menu structure with configurable user menu
- Password protection
- Non-volatile memory for transferring parameters
- Drive disable/enable
- IP20 enclosure



A Function keys
B Parameter transfer
C Active level
D Short text for code
E Code number
F Subcode number
G Parameter with unit
H Function keys

Selection	Order no.
Keypad XT	EMZ9371BC
Diagnosis terminal	E82ZBBXC
2.5 m connecting cable [1]	E82ZWL025
5 m connecting cable [1]	E82ZWL050
10 m connecting cable [1]	E82ZWL100

[1] The connecting cable is required to connect the diagnosis terminal to the controller.

EMZ9371BC

E82ZBBXC with connecting cable

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DC fuses

You can use the DC fuses assigned to each drive for the controllers' DC-bus connection and for operation with the brake module/brake chopper and/or power supply units. The assigned fuse holders are suitable for DIN rail mounting.

They are usually mounted above the controller. The pre-assembled busbar systems and the single-pin power supply terminals make assembly easy.

Assignment

Device	Fuse					
		Order no.				
	Rated current	Required	14 x 51 number	14 x 51 with	22 x 58 signalling device	22 x 58 with signalling device
9321	10 A/12 A	2	**EFSGR0100AYHN**	**EFSGR0100AYHK**	**EFSGR0120AYIN**	**EFSGR0120AYIK**
9322	10 A/12 A	2	**EFSGR0100AYHN**	**EFSGR0100AYHK**	**EFSGR0120AYIN**	**EFSGR0120AYIK**
9323	10 A/12 A	2	**EFSGR0100AYHN**	**EFSGR0100AYHK**	**EFSGR0120AYIN**	**EFSGR0120AYIK**
9324	20 A	2	**EFSGR0200AYHN**	**EFSGR0200AYHK**	**EFSGR0200AYIN**	**EFSGR0200AYIK**
9325	32 A	2	**EFSGR0320AYHN**	**EFSGR0320AYHK**	**EFSGR0320AYIN**	**EFSGR0320AYIK**
9326	40 A	2	**EFSGR0400AYHN**	**EFSGR0400AYHK**	**EFSGR0400AYIN**	**EFSGR0400AYIK**
9327	63 A	2			**EFSGR0630AYIN**	**EFSGR0630AYIK**
9328	100 A	2			**EFSGR1000AYIN**	**EFSGR1000AYIK**
9329	63 A	4			**EFSGR0630AYIN**	**EFSGR0630AYIK**
9330	100 A	4			**EFSGR1000AYIN**	**EFSGR1000AYIK**
9331	80 A	6			**EFSGR0630AYIN**	**EFSGR0630AYIK**
9332	100 A	6			**EFSGR1000AYIN**	**EFSGR1000AYIK**

Brake module, brake chopper

Device	Fuse					
		Order no.				
	Rated current	Required number	14 x 51	14 x 51 with signalling device	22 x 58	22 x 58 with signalling device
9351	20 A	2	**EFSGR0200AYHN**	**EFSGR0200AYHK**	**EFSGR0200AYIN**	**EFSGR0200AYIK**
9352	50 A	2			**EFSGR0500AYIN**	**EFSGR0500AYIK**

Regenerative power supply module

Device	Fuse					
		Order no.				
	Rated current	Required number	14 x 51	14 x 51 with signalling device	22 x 58	22 x 58 with signalling device
9341	20 A/32 A	2	**EFSGR0320AYHN**	**EFSGR0320AYHK**	**EFSGR0320AYIN**	**EFSGR0320AYIK**
9342	50 A	2			**EFSGR0500AYIN**	**EFSGR0500AYIK**
9343	100 A	2			**EFSGR1000AYIN**	**EFSGR1000AYIK**

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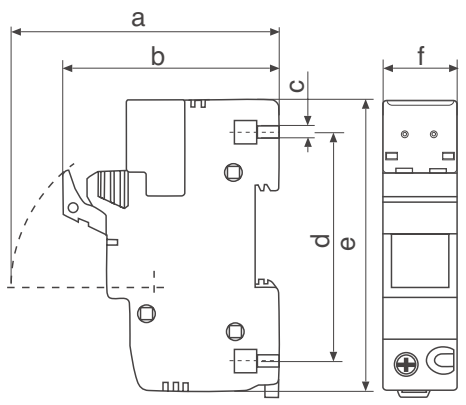
Fuse holder 14 x 51 mm Designation	Order no.
2-pin fuse holder without signalling device [1]	EFH20005
1-pin fuse holder with signalling device [2] [3]	EFH10005

Fuse holder 22 x 58 mm Designation	Order no.
2-pin fuse holder without signalling device [1]	EFH20007
1-pin fuse holder with signalling device [2] [3]	EFH10004

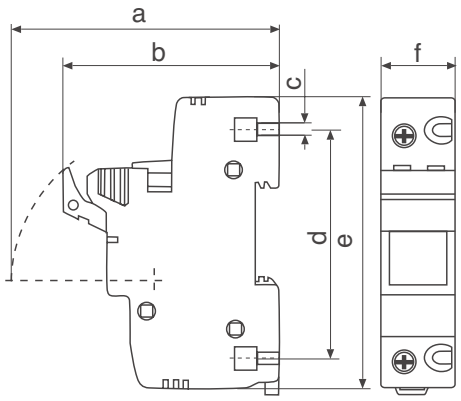
Other accessories [2]	
Designation	**Order no.**
DC busbar for 14 x 51 mm, 1 m	EWZ0036
DC busbar for 22 x 58 mm, 1 m	EWZ0037
Fuse-link contacts for DC busbar (unit packs of 10)	EWZ0038
1-pin terminal for internal supply of busbars for 14 x 51 and 22 x 58 mm [4]	EWZ0039

[1] UL approval only granted for AC operation.
[2] 14 x 51 and 22 x 58 mm fuse-links with signalling device, fuse holders with signalling device and accessories do not have UL approval.
[3] Two fuse holders required for each.
[4] The terminal provides a simple means of connecting a central supply to the busbar system and for the connection of busbar systems (two terminals are required in each case).

Fuse holder 14 x 51
Dimensions

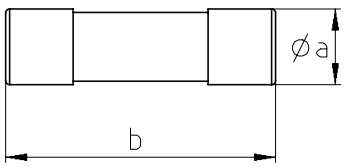


Fuse holder with signalling device



Fuse holder without signalling device

Fuse holder	Dimensions [mm]					
	a	b	c	d	e	f
14 x 51	94.2	76	4.5	80.5	102.5	26.5



Fuse-link	Dimensions [mm]	
	a	b
14 x 51	14	51

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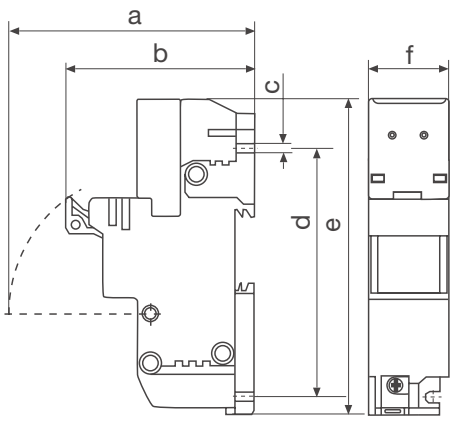
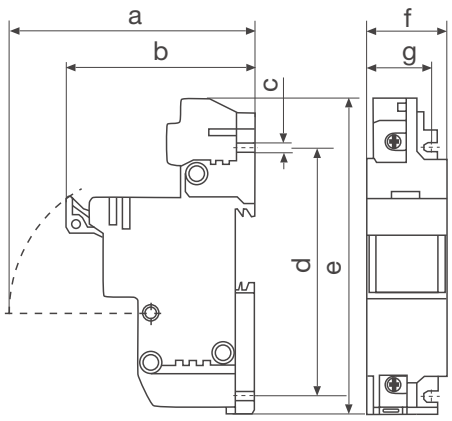
DC fuses

Fuse holder 22 x 58
Dimensions

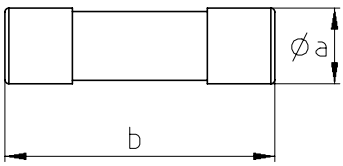


Fuse holder with signalling device



Fuse holder without signalling device

Fuse holder	Dimensions [mm]						
	a	b	c	d	e	f	g
22 x 58	112	86	4.5	110	142	37	27



Fuse-link	Dimensions [mm]	
	a	b
22 x 58	22	58

6

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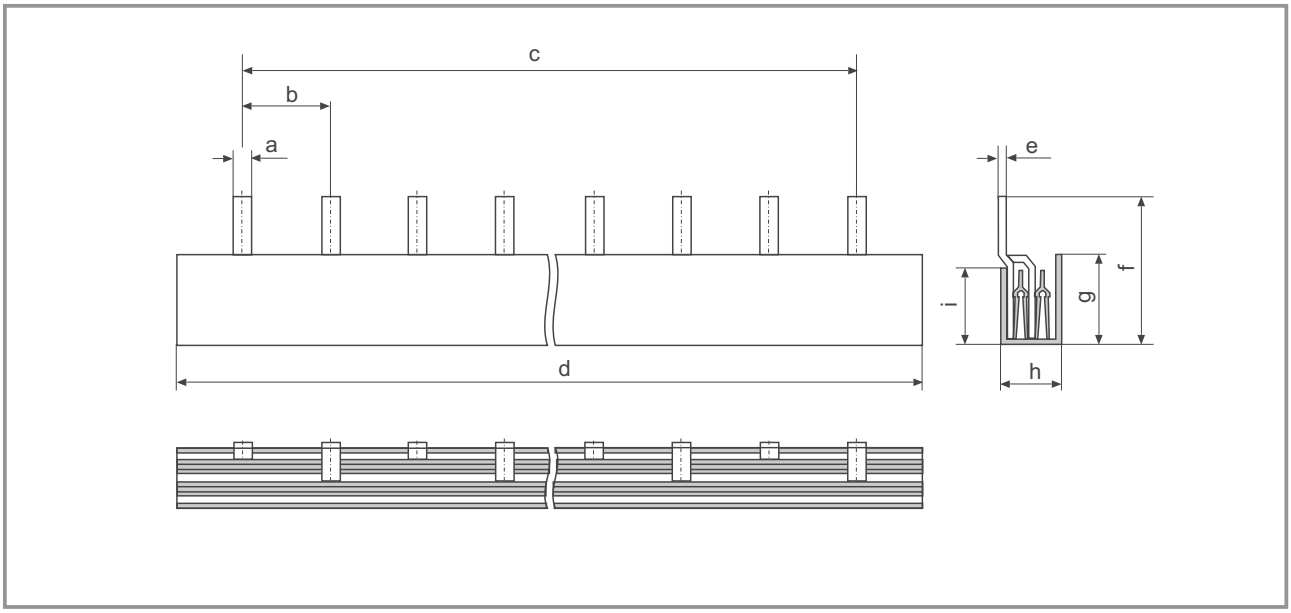
DC busbar system



DC busbar	Dimensions [mm]								
	a	b	c	d	e	f	g	h	i
14 x 51	6	26.5	980.5	1020	1.5	45	27	18.3	23
22 x 58	6	37	999	1020	1.5	52	27	18.3	23

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Brake module/Brake chopper

If a motor is braked by the servo inverter, the motor will operate in generator mode and feed back energy to the servo inverter.

By using a braking unit comprising a brake module with built-in resistor or brake chopper with external resistor, the feedback energy can be dissipated via the brake resistor and converted into heat. The drive can be braked under controlled conditions.

Special versions on request
Like the servo inverters, the brake controllers are also available in a cold plate version. Thermal separation is also possible.

9351 brake module
The 9351 brake module is supplied with a built-in brake resistor. This brake resistor has a resistance of 47 ohms. The maximum peak braking power is 12 kW. The maximum braking time is limited to 4 seconds at that power, based on a 1% braking duty cycle.

Depending on the braking power required, the brake module can be used with all 9300 servo inverters.

If a higher braking power is required, the 9352 brake chopper can be used with an appropriate brake resistor.

9352 brake chopper
The 9352 brake chopper can be optimised for the required braking power. For this purpose, this brake chopper is operated with an external brake resistor. The minimum brake resistance is 18 ohms.

The brake chopper can be installed directly adjacent to the servo inverter.

If a lower braking power is required, the 9351 brake module can be used with an appropriate brake resistor.

Technical data for the 9351 brake module

Supply voltage	270 ... 780 V DC
Switching threshold at 400 V AC	725 V DC
Switching threshold at 460 V AC	725 V DC
Switching threshold at 480 V AC	765 V DC
Max. current	16 A DC
Continuous braking power	100 W
Peak braking power	12 kW
Max. braking energy	50 kWs
Min. brake resistance	47 ohms, internal
Weight	2.6 kg

Technical data for the 9352 brake chopper

Supply voltage	270 ... 780 V DC
Switching threshold at 400 V AC	725 V DC
Switching threshold at 460 V AC	725 V DC
Switching threshold at 480 V AC	765 V DC
Max. current	42 A DC
Continuous braking power	19 kW
Peak braking power	32 kW (max. operating time 60 s)
Max. braking energy	to brake resistance
Min. brake resistance	18 ohms
Weight	2.2 kg

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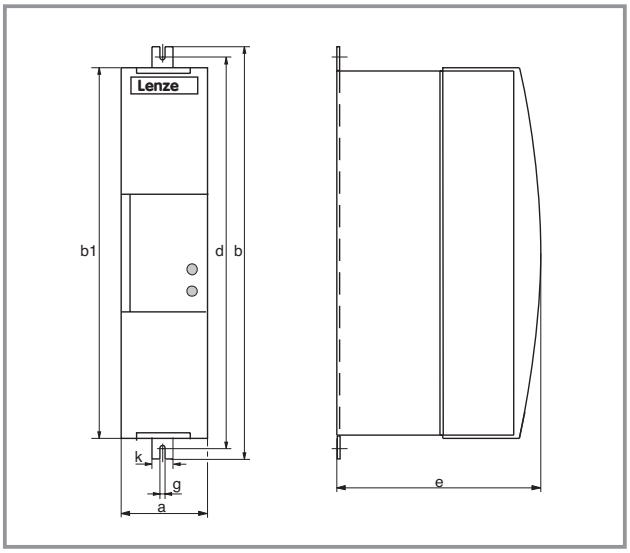
Standards and operating conditions

Area	Values
Vibration resistance	Germanischer Lloyd, general conditions
Humidity	Humidity class F, no moisture condensation (average relative humidity 85%)
Permissible temperature ranges	Transport: -25 ... +70°C Storage: -25 ... +70°C Operation: 0 ... +55°C +40 ... +55°C with power reduction (2%/K)
Permissible installation height	Up to 4000 m amsl 1000 ... 400 m amsl with power reduction (5%/1000 m)
Pollution degree	VDE 0110 Part 2, pollution degree 2
Insulation resistance	Overvoltage category III to VDE 0110
Packaging	Dustproof packaging to DIN 4180
Enclosure	IP20 with terminal covers fitted IP41 on heatsink side with push-through technique thermal separation NEMA 1: Protection against contact
Labelling Approvals	CE: Meets the requirements of the EC's Low Voltage Directive UL: Approval to UL 508C: Power Conversion Equipment, file no. E132659

Dimensions



Device	Dimensions [mm]							
	a	b	b1	c	d	e	g	k
9351, 9352	52	384	350	26	365	186	6.5	30

Device	Order no.
9351	EMB9351-E
9352	EMB9352-E
Mounting set for thermal separation	EJ0040

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Brake module/Brake chopper

Assignment of the brake resistor/brake chopper to the 9300 servo inverter

Device	Required number	Brake chopper	Brake resistor					
	Brake chopper with brake resistor	Order no.	Order no.	Resistance [Ohm]	Peak power [kW]	Cont. power [W]	Thermal capacity [kWs]	Weight [kg]
9321	1	EMB9352-E	ERBD180R300W	180	3.0	300	45.0	2.0
9322	1	EMB9352-E	ERBD180R300W	180	3.0	300	45.0	2.0
9323	1	EMB9352-E	ERBD082R600W	82	6.0	600	90.0	3.1
9324	1	EMB9352-E	ERBD068R800W	68	8.0	800	120.0	4.3
9325	1	EMB9352-E	ERBD047R01k2	47	12.0	1200	180.0	4.9
9326	1	EMB9352-E	ERBD047R01k2	47	12.0	1200	180.0	4.9
9327	1	EMB9352-E	ERBD033R02k0	33	17.0	2000	300	7.1
9328	1	EMB9352-E	ERBD022R03k0	22	26.0	3000	450	10.6
9329	1	EMB9352-E	ERBD018R03k0	18	32.5	3000	450	10.6
9330	2	EMB9352-E	ERBD022R03k0	22	26.0	3000	450	10.6
9331	2	EMB9352-E	ERBD022R03k0	22	26.0	3000	450	10.6
9332	2	EMB9352-E	ERBD022R03k0	22	26.0	3000	450	10.6

Please note:

- The assignments listed in the table permit:
  - Maximum braking time of up to 15 seconds
  - A relative operating time of 10%
- You can increase the braking time by:
  - Using other resistors (R ≥ 18 ohms)
  - Connecting a number of resistors in parallel (R_{res} ≥ 18 ohms)
  - Connecting a number of braking units in parallel

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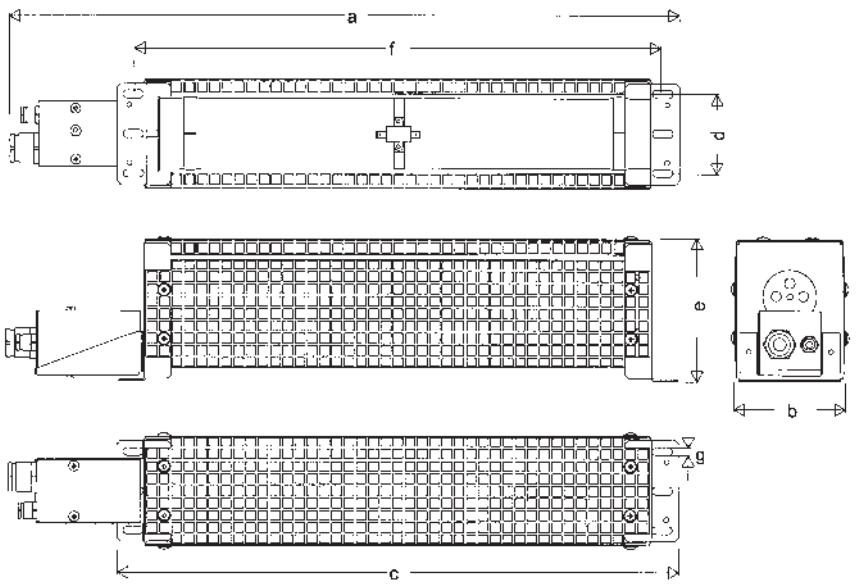
Dimensions: Wire brake resistors



Brake resistor	Dimensions [mm]							
Order no.	a	b	c	d	e	f	g	h
ERBD180R300W	440	89	354	64	115	326	6.5	13
ERBD082R600W	640	89	554	64	115	526	6.5	13
ERBD068R800W	540	177	454	150	115	526	6.5	13
ERBD047R01k2	640	177	554	150	115	526	6.5	13
ERBD033R02k0	640	265	654	240	115	526	6.5	13
ERBD022R03k0	740	177	654	150	229	626	6.5	13
ERBD018R03k0	740	177	654	150	229	626	6.5	13

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9340 regenerative power supply modules

9340 regenerative power supply modules can be particularly useful for multi-axis and interconnected drives. These are compact devices with IP20 enclosure. The universality of the 9300 range system means that these add-on components can be mounted directly adjacent to the 9300 servo inverters. Any brake energy is fed back into the mains via the regenerative power supply modules..

Remember that the assigned mains filter must be used for the mains connection!

Special versions on request
Like the servo inverters, the regenerative power supply modules are also available in a cold plate version. Thermal separation is also possible.

If braking energy does not need to be fed back, 9360 DC power supply units can also be used for the central supply of multi-axis and interconnected drives.

In such cases, the 9351 brake module or 9352 brake chopper can be used as alternatives for temporary braking operation. These modules convert the braking energy into heat.

General data and operating conditions

Area	Values
Vibration resistance	Germanischer Lloyd, general conditions
Humidity	Class 3K3 to EN50178 (no moisture condensation, average relative humidity 85%)
Permissible temperature ranges	Transport: -25°C ... +70°C Storage: -25°C ... +55°C Operation: 0°C ... +55°C +40°C ... +55°C with power reduction (2%/K)
Installation height	Up to 4000 m amsl 1000 ... 4000 m amsl with power reduction (5%/1000 m)
Pollution degree	VDE 0110 Part 2, pollution degree 2
Noise immunity	IEC801-2 to 5 severity 4
Insulation resistance	Overvoltage category III to VDE 0110
Packaging	To DIN 4180 ▶ 9341 and 9342: Dustproof packaging ▶ 9343: Shipping container
Enclosure	IP20 IP41 IP41 on heatsink side with push-through technique thermal separation NEMA1 Protection against contact
Labelling Approvals	CE: Meets the requirements of the EC's Low Voltage Directive UL: Approval to UL 508C: Power Conversion Equipment, file no. E132659

Rated data

Type	9341	9342	9343
Order no.	EMB9341-E	EMB9342-E	EMB9343-E
Mains voltage	320 ... 528 V AC ± 0%		
Mains frequency	48 ... 62 Hz ± 0%		
Output power [kVA]	7.8	15.6	29.6
Rated mains current [A]	12.0	24.0	45.0
Max. mains current [A]	18.0	36.0	72.0
Power loss [W]	100	200	400
Power reduction	2%/K, 5%/1000 m		

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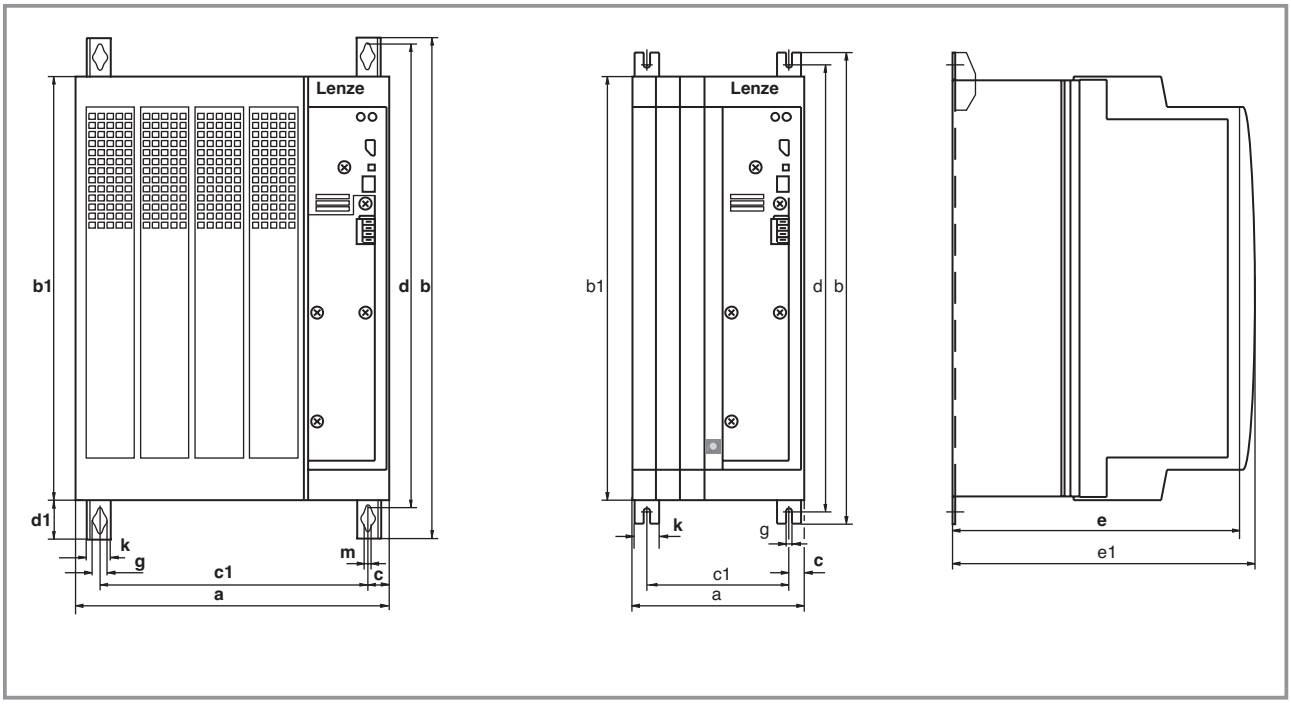
Dimensions



Device	Dimensions [mm]											Weight
	a	b	b1	c	c1	d	d1	e	e1	g	k	[kg]
9341	135	384	350	21,5	92	365	–	230	250	6.5	30	7.5
9342	135	384	350	21,5	92	365	–	230	250	6.5	30	7.5
9343	250	404	350	14	205	396	24	230	250	6.5	25	12.5

Installation with thermal separation (push-through technique)

Device	Mounting set for thermal separation
9341, 9342	EJ0038
9343	EJ0011

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9340 regenerative power supply modules

Mains filters

The mains filters for the regenerative power supply modules have been designed to meet the requirements of limit class A..

Limit class A is often required for industrial mains supplies operating separately from mains supplies in residential areas. Additional interference suppression measures are required for use in residential areas.

Assignment and technical data

Device	Mains filter A				
	Order no.	I_r [A]	U_{mains} [V]	Inductance [mH]	Weight [kg]
9341	EZN3A0120H012 [1)]	12.0	480	1.20	4.7
9342	EZN3A0088H024 [1)]	24.0	480	0.88	12.2
9343	EZN3A0055H045	45.0	480	0.55	15.0
9343	EZN3A0055H045U [1)]	45.0	480	0.55	15.0

[1)] The RFI filters meet UL/cUL requirements.

Dimensions of mains filter A (9341, 9342)

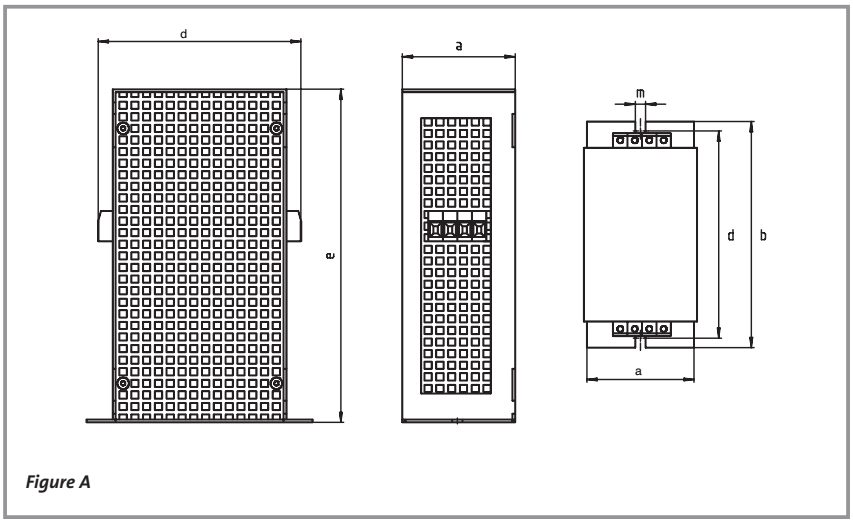

Figure A

Order no.		Dimensions [mm]						
	Figure	a	b	c	d	e	m	n
EZN3A0120H012	A	135	260	135	245	230	7.0	–
EZN3A0088H024	A	135	380	135	365	230	7.0	–

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Dimensions of mains filter A (9343)

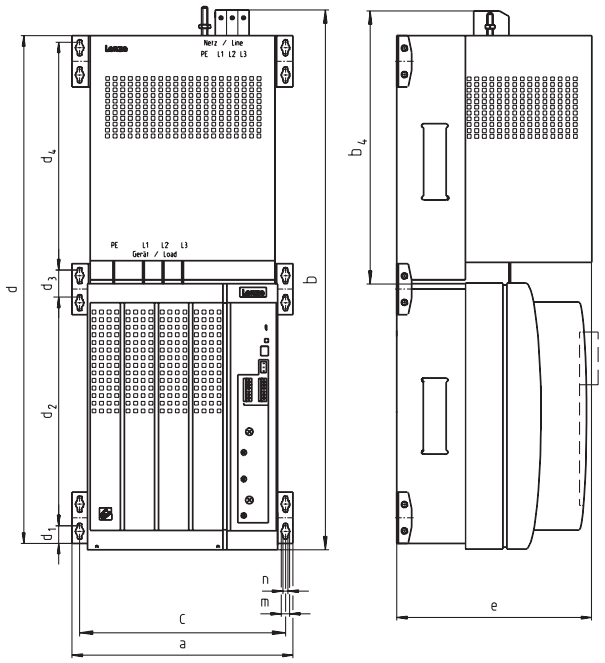

Figure B

Order no.	Figure	Dimensions [mm]											
		a	b	b_1	c	d	d_1	d_2	d_3	d_4	e	m	n
EZN3A0055H045	B	278	710	365	258	670	22	300	38	300	250	11	6.5
EZN3A0055H045U	B	278	710	365	258	670	22	300	38	300	305	11	6.5

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9360 DC power supply units

9360 DC power supply units can be used to supply multi-axis systems with DC voltage centrally. Particularly if the controllers operating on the DC network can exchange powers or are not operating at the same time, the expenditure for the mains connection can be reduced significantly.

Remember that DC power supply units must only be operated with an assigned mains filter/assigned mains choke!

In the event of temporary excess braking energy, brake modules or brake choppers can be added to the DC-bus. These modules convert the excess braking energy into heat.

General data for DC power supply units

Area	Values
Vibration resistance	Germanischer Lloyd, general conditions
Humidity	Humidity class F, no moisture condensation (average relative humidity 85%)
Permissible temperature ranges	Transport: -25°C ... +70°C Storage: -25°C ... +55°C Operation: -10°C ... +55°C +40°C ... +55°C wit power reduction (1.5%/K)
Permissible installation height	Up to 4000 m amsl 1000 ... 4000 m amsl with power reduction (5%/1000 m)
Pollution degree	VDE 0110 Part 2, pollution degree 2
Noise emission	Requirements to EN 50081-2, EN 50082-1, IEC 22G-WG4 (Cv) 21 Limit class A to EN 55011 (industrial premises) can be achieved with mains filter B[1)]
Noise immunity	Limit values achieved with mains filter. Requirements to EN 50082-2, IEC 22G-WG4 (Cv) 21. **Requirements** / **Standard** / **Severity** ESD / EN61000-4-2 / 3, i.e. 8 kV for air discharge and 6 kV for contact discharge RF interference (housing) / EN61000-4-3 / 3, i.e. 10 V/m; 27 to 1000 MHz Burst / EN61000-4-4 / 3/4, i.e. 2 kV/5 kHz Surge (surge voltage on mains cable) / IEC 1000-4-5 / 3, i.e. 1.2/50 µs, 1 kV phase-phase, 2 kV phase-PE
Insulation resistance	Overvoltage category III to VDE 0110
Packaging	Dustproof packaging to DIN 4180
Enclosure	IP00 Safe to touch to VBG 4
Labelling Approvals	CE: Meets the requirements of the EC's Low Voltage Directive

[1)] Measured with 8 x 93□□ controllers each with 10 m of shielded motor cable

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Rated data

	Type	9364	9365
	Order no.	EME9364-E	EME9365-E
Mains voltage	U_r [V]	3 AC 100 V ± 0% ≤ U_r ≤ 550 V ± 0%; 48 Hz ... 62 Hz ± 0%	
Mains voltage separate fan	U_F [V]	–	1 AC 230 V, 50 Hz/60 Hz
Mains current with mains filter/ mains choke [1]	I_r [A]	74.0	148.0
Maximum mains current [2]	I_{rmax} [A]	111.0	222.0
Apparent power on the mains side	S_r [kVA]	51.0	103.0
DC-bus voltage	U_{DC} [V]	150 V ± 0% ≤ U_{DC} ≤ 780 V ± 0%	
DC-bus current	I_{DC} [A]	90.0	180.0
Maximum DC-bus current [2]	I_{DCmax} [A]	135.0	270.0
Active output power [3]	P_{DCN} [kW]	50.0	100.0
Maximum active output power [3]	P_{DCmax} [kW]	75.0	150.0
Power loss in operation at rated values	P_v [W]	173.0	389.0
Power reduction	[%/K] [%/m]	+40 ... +55°C: 1.5%/K 1000 ... 4000 m amsl: 5%/1000 m	
Dimensions	Length x Width x Height [mm]	280 x 175 x 208	
Weight	m [kg]	4.8	5.8

[1] Dimensions are calculated using the following formula: $I_r \geq \sum I_{mains}$ (I_{mains} is the mains current of the controller with mains filter/choke). If interconnected drives are operating in generator mode or if not all drives are operating at the same time, the resulting mains current will be reduced accordingly.

[2] Currents valid for periodic load change cycle with 1 minute overcurrent duration at the current indicated here and 2 minutes base load duration at 75% I_r

[3] Valid for mains voltage U_r = 400 V

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9360 DC power supply units

Mains filters

The mains chokes and mains filters designed for the 9360 DC power supply units must be selected on the basis of the resulting mains current. Using mains chokes only reduces the low-frequency current harmonics of the mains current. Multi-axis operation means that a type B filter must be used to ensure adherence to limit class A.

Assignment and technical data

Mains chokes

Device	Assigned mains chokes					
	Type	I_r [A]	U_r [V]	L [mH]	Weight [kg]	Recommended mains fuse
9364	ELN3-0088H035	35.0	500	0.88	9.8	M 50 A
	ELN3-0075H045	45.0		0.75	8.5	M 63 A
	ELN3-0055H055	55.0		0.55	13.0	M 80 A
	ELN3-0038H085	85.0		0.38	18.0	M 100 A
9365	ELN3-0038H085	85.0		0.38	18.0	M 125 A
	ELN3-0027H105	105.0		0.27	18.0	M 160 A
	ELN3-0022H130	130.0		0.22	20.6	M 160 A
	ELN3-0017H170	170.0		0.17	20.6	M 200 A

Mains filters

Device	Assigned mains filters					
	Type	I_r [A]	U_r [V]	L [mH]	Weight [kg]	Recommended mains fuse
9364	EZN3B0110H030U [1)]	30.0	380 ... 480	1.10	22.5	M 50 A
	EZN3B0080H042	42.0		0.80	22.5	M 50 A
	EZN3B0055H060	60.0		0.55	30.0	M 80 A
	EZN3B0037H090	90.0		0.37	42.0	M 100 A
9365	EZN3B0037H090	90.0		0.37	42.0	M 125 A
	EZN3B0030H110	110.0		0.30	50.0	M 160 A
	EZN3B0022H150 [1)]	150.0		0.22	65.0	M 200 A

[1)] Footprint filter

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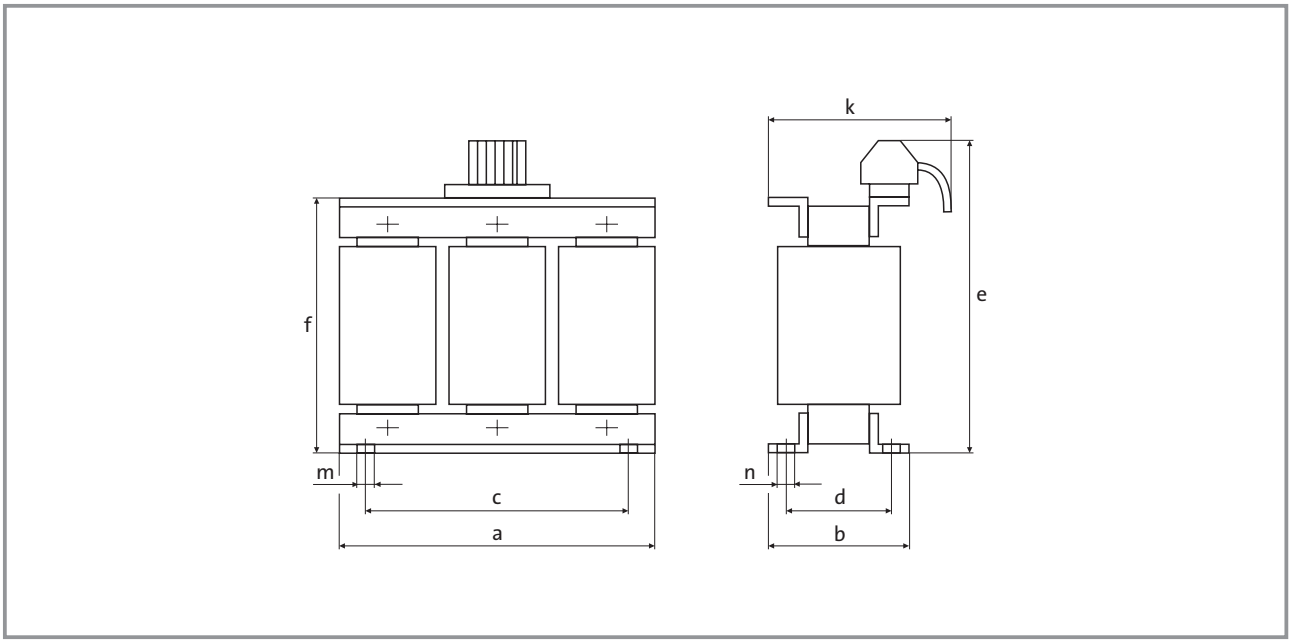
Dimensions: Mains choke



Mains choke	Dimensions [mm]								
	a	b	c	d	e	f	k	m	n
ELN3-0088H035	180	91	161	74	225	165	120	6.3	11
ELN3-0075H045	180	91	161	74	225	165	120	6.3	11
ELN3-0055H055	228	88	206	69	263	205	120	6.3	11
ELN3-0038H085	228	111	206	94	263	205	140	6.3	11
ELN3-0027H105	228	111	206	94	273	205	150	6.3	11
ELN3-0022H130	264	102	240	81	265	237	135	6.3	11
ELN3-0017H170	264	128	240	107	257	237	166	8.3	16

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9360 DC power supply units

Mounting with footprint mains filter (9364)

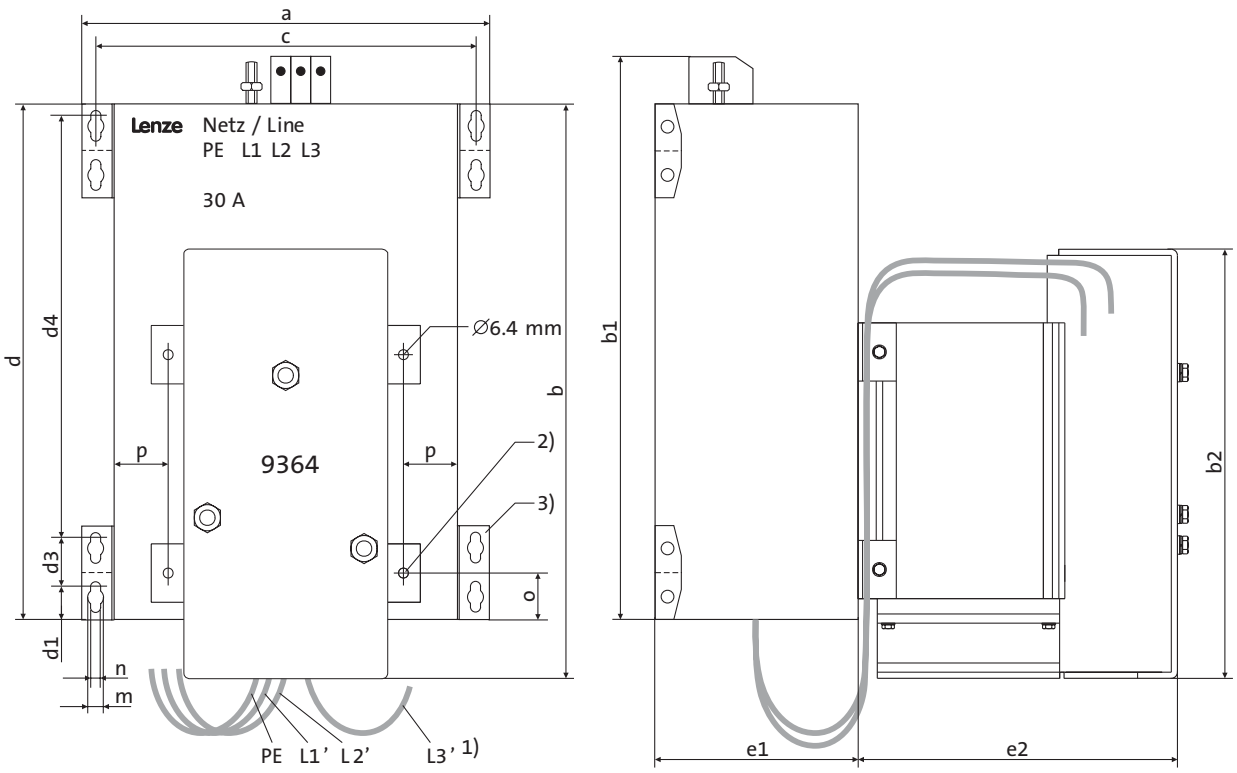

Figure A

Order no.	Dimensions [mm]														
	a	b	b1	b2	c	d	d1	d3	d4	e1	e2	m	n	o	p
EZN3B0110H030U	278	375	361	280	258	336	22	38	268	132	208	11	6.5	30	41

[1] Output-side cables on the filter are prefabricated. The electrical connection fastenings are supplied in the assembly kit. Cable lengths: PE, L1', L2', L3' 330 mm each
[2] The threads for fastening the DC power supply unit are located in the filter housing
[3] Only one fixing strap is required for mounting the filter.

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Mounting with connected mains filter (9364, 9365)

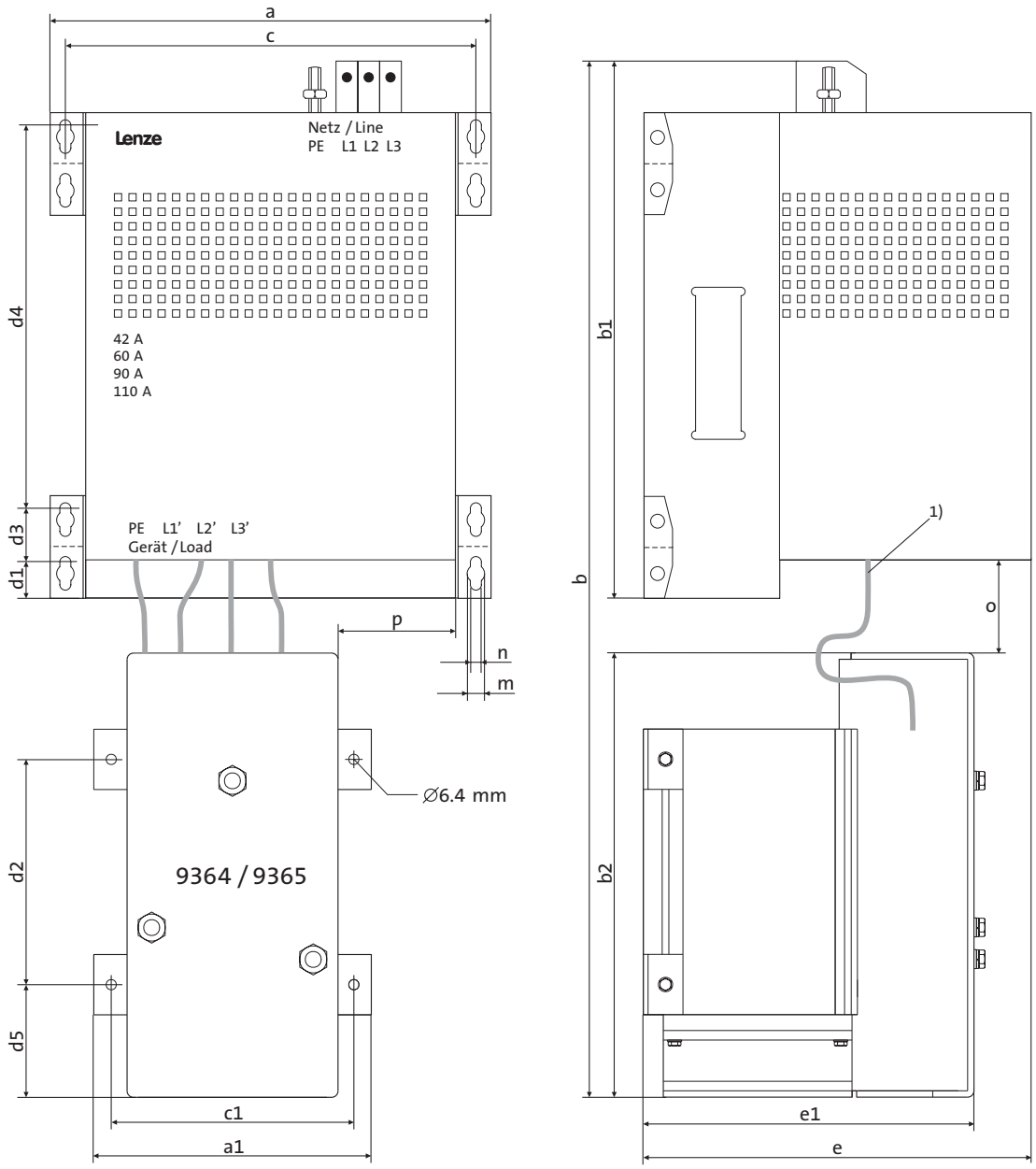

Figure B

Order no.	Dimensions [mm]																	
	a	a1	b	b1	b2	c	c1	d1	d2	d3	d4	d5	e	e1	m	n	o	p
EZN3B0080H042	278	175	620	370	280	258	153	22	142	38	300	70	230	208	11	6.5	25	78
EZN3B0055H060			635										285				15	83
EZN3B0037H090	368	175	835	516	280	345	153	38	142	48	335	70	285	208	18	11	75	130
EZN3B0030H110																		

[1] Output-side cables on the filter are prefabricated. The electrical connection fastenings are supplied in the assembly kit.

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9360 DC power supply units

Mounting with footprint mains filter (9365)

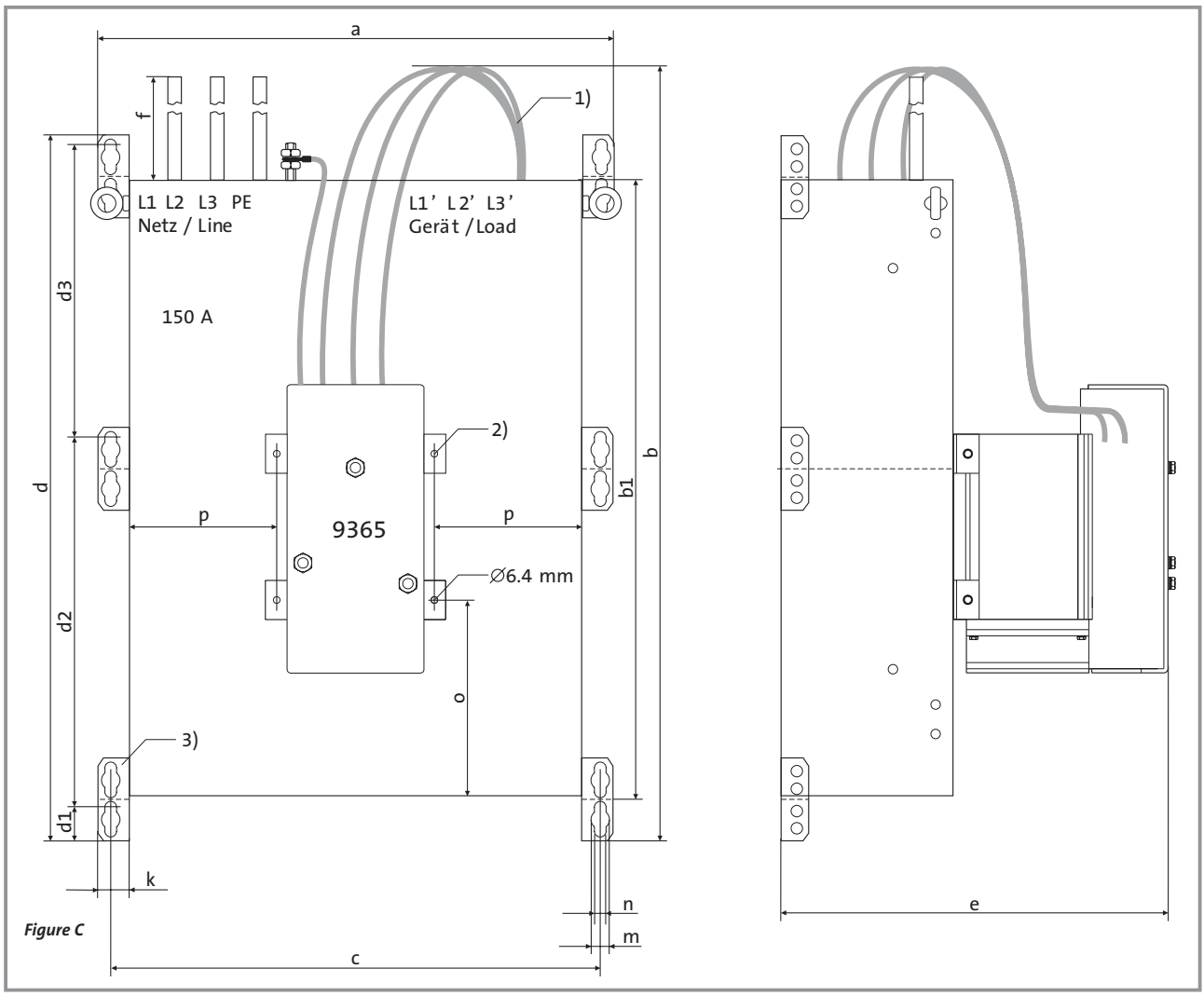

Figure C

Mains filter	Dimensions [mm]														
	a	b	b1	c	d	d1	d2	d3	e	f	k	m	n	o	p
EZN3B0022H150	478	800	680	455	750	38	372	328	400	1000	28	18	11	190	135

[1] Output-side cables on the filter are prefabricated. The electrical connection fastenings are supplied in the assembly kit. Cable lengths: L1', L2', L3' 700 mm each
[2] The threads for fastening the DC power supply unit are located in the filter housing
[3] Only one fixing strap is required for mounting the filter.

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The Lenze team does not just offer the necessary manpower and technical know-how – we are passionate and meticulous about what we do. We will only be happy once you are entirely satisfied with our work. Our team of professionals provides assistance over the telephone or on site, ensures the express delivery of spare parts and carries out repairs with incredible urgency. We're fast and reliable.

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Our products are available for speedy delivery worldwide. Lenze companies, Lenze factories and sales agencies are based in major industrial countries around the world. Contact them through our website **www.Lenze.com**, which also gives you 24-hour access to technical instructions and product manuals. Local support, on site if you need it, is available.

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Technical documentation

The technical documentation provides more detailed information about our products:

- Mounting Instructions in three languages are supplied with our products.
- Our System Manuals for controllers, our Communication Manuals for bus systems and our Operating Instructions for electromechanical products and accessories provide the information required for planning, designing and developing machines and systems. System Manuals and Communication Manuals are supplied in loose-leaf format. Operating Instructions are bound.
- Our User's Manuals for our controllers are designed for the operators and users of machines and systems. The information in User's Manuals has been put together so that it can be integrated directly into the machine or system documentation.

All our technical documentation is available free of charge in PDF format

- Via Internet download from "www.lenze.de", "Downloads" area
- On the "Lenze Library" CD

System Manuals and Communication Manuals can also be supplied in ring binder format for a nominal fee.

Technical documentation at a glance

Documentation	Contents	Target group	Available languages
Mounting Instructions	Safety instructions, handling and installation	Installation personnel	In three languages: German, English, French
System Manual **Communication Manual** **Operating Instructions**	Extensive and comprehensive information for design, construction, development and programming	Planning engineers, design engineers and developers of machines and systems	Single-language version: German, English or French
User's Manual	Safety instructions, handling, troubleshooting and fault elimination	Operators and users of machines and systems	Single-language version German, English or French. Other languages will shortly be available on request

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Brake chopper	EMB9352-E		
Assembly kit for thermal separation	EJ00__		
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